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LIFE SCIENCES

BIOMEDICAL AND BEHAVIORAL SCIENCES



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USSR REPORT
LIFE SCIENCES
BIOMEDICAL AND BEHAVIORAL SCIENCES

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AGROTECHNOLOGY

ORGANOPHOSPHORUS INSECTICIDES DEVELOPED

Moscow PRAVDA in Russian 8 Oct 84 p 3

LAPTEV, N., correspondent

[Abstract] The article reports on organophosphorus fungicides which have been developed for agriculture. Among the research institutes taking part in their development were the All-Union Scientific Research Institute of Phytopathology (VNIIF) and the All-Union Institute of Chemical Agents for Protection of Plants. Two compounds possessing high biological activity are called "afos" and FS-UMO. It is said they have been widely tested with good results, and they have been patented in several western countries, including the USA.

Commenting on the organophosphorus compounds, Doctor of Chemical Sciences N. Bliznyuk, head of VNIIF's pesticides synthesis laboratory, recalled that about 10,000 new compounds were synthesized and tested in the course of development of "afos". He noted that the fungicides are effective not only against wheat mildew, but also against fungus diseases of rice and apples. He said they break down quickly into products of low toxicity, and their safety for humans and the environment has been confirmed by the USSR Ministry of Public Health.

Also quoted is S. Sanin, VNIIF's deputy director for science, who reported that highly efficient methods for forecasting fungus infections of crops have been developed, and that they are used in two computerized systems for management of crop protection which have been developed and are now undergoing testing.

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GENETIC ENGINEERING IN ANIMAL HUSBANDRY: INDUCTION OF ESSENTIAL AMINO ACID SYNTHESIS IN MAMMALIAN CELLS

Moscow SEL'SKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 10, Oct 84
(manuscript received 9 Apr 84) pp 63-69

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[Abstract] The general principles of genetic engineering are reviewed in relation to the problems of introducing microbial genes into mammalian cells for livestock improvement. Particularly attention is accorded to the introduction of *E. coli* threonine genes by microinjection into mammalian zygotes as a means of securing synthesis of essential amino acids. The possibility is raised of using a perhaps simpler yeast system, but it remains to be determined whether yeast genes can function normally in eukaryotic cells. A similar proposal has been advanced for the utilization of plant genes for the synthesis of essential amino acids in mammalian cells, but the problems involved in expression may be even more complex than with the yeast system. Equally troublesome may be the manipulation of the mammalian zygotes for gene insertion. However, the initial studies do indicate that in the future it may well be possible to obtain livestock with metabolic properties that could not arise as a result of spontaneous mutations. Figures 2; references 33: 13 Russian, 20 Western.
[1011-12172]

UDC 633.1:581.167/577.21/575.113

STRUCTURAL AND FUNCTIONAL ORGANIZATION OF CEREAL GENOME

Moscow SEL'SKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 10, Oct 84
(manuscript received 12 Dec 83) pp 70-78

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[Abstract] Largely Western data are reviewed on the structural and functional characteristics of cereal genomes. The review encompasses consideration of satellite DNA fractions, palindrome sequences, selfish" DNA, etc. Special

attention is accorded to highly-repeated DNA sequences, moderately repeated and unique sequences as part of genome organization. Consideration is also given to the detailed studies conducted on rRNA genes as an approach to fine structural analysis of the plant genome. More detailed knowledge of the type specified should further advance the practical results obtained by genetic engineering in species improvement. Figures 2; references 53: 7 Russian, 46 Western.

[1011-12172]

UDC 632.95.028:579.222.4:[577.213.7+577.217]

IMPORTANCE OF PLASMIDS IN MICROBIAL DEGRADATION OF PESTICIDES (REVIEW)

Moscow SEL'SKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 10, Oct 84
(manuscript received 7 Feb 84) pp 79-85

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[Abstract] A review is provided of essentially Western literature on the mechanisms of microbial degradation of organochlorine pesticides, with particular emphasis on the importance of plasmids in this process. Data are included on the use of plasmids for the construction of bacterial strains particularly efficient in xenometabolism, including the metabolism of 2,4,5-trichlorophenoxyacetic acid (2,4,5-T). Attention is accorded to the evolution and genetics of strains capable of such degradation. It is also pointed out that the relative lack of success in the isolation of bacterial strains capable of degrading certain organochlorine pesticides, such as 2,4,5-T, is often due to the low concentration of such compounds in the soil. References 46: 3 Russian, 43 Western.

[1011-12172]

UDC 612.171.014.462.4.014:615.31:547.582.2

INFLUENCE OF MACROCYCLIC POLYESTER 15-CROWN-5 ON IONIC PERMEABILITY OF
EXCITABLE MEMBRANE

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 97,
No 8, Aug 84 (manuscript received 16 Aug 83) pp 165-168

BOGATSKIY, A. V., deceased, LUK'YANENKO, N. G., SAVENKO, T. A., VONGAY, V. G.,
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[Abstract] A study is presented of the mechanism of action of 15-crown-5 on
biological and model membranes. The influence of 15-crown-5 on the surface
potential of biological membranes was studied on the example of bimolecular
lipid membranes by a potentiodynamic method. The effect of 15-crown-5 on the
heart can be reduced to changes in the excitability parameters of the sinoatrial
node. The specifics of the physiological activity of 15-crown-5 are quite
similar to the spectrum of cardiotropic action of Ca-channel blockers. This
indicates that the probable cause of the negative chronotropic effect of
15-crown-5 is the mixed effect of suppressing conduction through the slow
sodium-calcium channels of the cells of the sinoatrial node and also through
slow and fast channels of the atrial cells. The influence of 15-crown-5 on
the process by which Na channels come out of inactivation is dual: delay in
beginning and decrease in speed of reactivation. One possible cause for the
influence of 15-crown-5 on the refractory period of the incoming current
channel is disruption of Ca-dependent packing of lipids in the lipoprotein
matrix of the membrane. Figures 4; references 15: 8 Russian, 7 Western.
[1512-6508]

STEROID CHEMISTRY

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 10, No 8, Aug 84
(manuscript received 8 May 84) pp 1059-1072

TORGOV, I. V., Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow

[Abstract] Works on steroid chemistry at the author's institute have been directed toward the production of physiologically active compounds including those having hormonal effects. Studies have included work on complete synthesis of steroid systems and partial synthesis based on available natural compounds such as cholesterol, eirgosterol and pregnenolone. Several synthetic approaches have been tested, the most successful being a method based on the condensation of bicyclic vinylcarbinols with cyclic 1,3-diketone to steroid diketones. A second method is ionic hydrogenation consisting of treatment of 8,9-dehydro compounds with triethylsilane in the presence of CF_3COOH . A number of works have been undertaken on the production of group D provitamins, so important for medicine and agriculture. Among the polyhydroxylated cholesterol derivatives, great attention is presently being given to insect juvenile hormones and their analogs and derivatives since they allow control of pest populations and are therefore promising for agriculture. The method of partial synthesis has been successfully used for the production of dihydro-batrachotoxin, a powerful toxic cardiotoxic which has been used in the study of the problem of nerve impulse transmission. References 22: 18 Russian, 4 Western.
[1511-6508]

UDC 577.182.26'17:547.964.4.057

SYNTHESIS OF DIMER ANALOGS OF GRAMICIDIN A

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 10, No 8, Aug 84
(manuscript received 7 May 84) pp 1073-1079

FONINA, L. A., DEMINA, A. M., SYCHEV, S. V. and IVANOV, V. T., Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow, and KHLAVACHEK, Ya., Institute of Organic Chemistry and Biochemistry, CSSR Academy of Sciences, Prague

[Abstract] The authors synthesized 'head-to-head' gramicidin dimers and studied the interaction of deformyl gramicidin A with various activated derivatives of dicarboxylic acids. Attempts to use the corresponding acid chlorides were unsuccessful. The difficulty of production and isolation of chlorides in pure form and the formation of large numbers of side products during condensation with deformyl gramicidin A forced rejection of the method. Better results were obtained by condensation of deformyl gramicidin A with

dipentafluorophenyl esters of dicarboxylic acids. 'Head-to-tail' and 'tail-to-tail' analogs were also obtained by 2-stage synthesis. All of the analogs were separated from ionogenic impurities by ion-exchange chromatography and purified further by chromatography in a thin layer of silica gel. Figures 2; references 16: 4 Russian, 12 Western.
[1511-6508]

UDC 577.182.26'17.012

CONFORMATIONAL STATES OF DIMER ANALOGS OF GRAMICIDIN A

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 10, No 8, Aug 84
(manuscript received 14 May 84) pp 1080-1088

SYCHEV, S. V., FONINA, L. A. and IVANOV, V.T., Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow

[Abstract] Results are presented from a study of the spatial structure in solution of some covalently cross-linked bis-gramicidins in which the terminal fragments of the two gramicidin A molecules are connected by bridges of various lengths 'head-to-head', 'head-to-tail' and 'tail-to-tail'. Major information on the structure of the peptides was obtained by breaking the experimental IR spectrum down into its components. The most unexpected result of the work was the fact that when solutions of the 'head-to-tail' analogs were diluted there was a decrease in the content of antiparallel double spirals, which would seem to have been more stable than in the gramicidin A, where they are dominant. Analysis of these data indicates that the formation of $\uparrow\downarrow\pi\pi$ LD spirals in the bis-gramicidin A derivatives is an intermolecular process requiring joining of N-C-terminal fragments of gramicidin A. The results produced relate directly to interpretation of the membrane properties of gramicidin series peptides. Figures 9; references 19: 2 Russian, 17 Western.
[1511-6508]

UDC 577.112.6:012.7

CONFORMATIONAL ANALYSIS OF CYCLOHEXADECADEPSIPEPTIDE IONOPHORE CYCLO [-(D-Ile-Lac-Ile-D-Hyl)₄ -]

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 10, No 8, Aug 84
(manuscript received 3 Apr 84) pp 1089-1099

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[Abstract] A study is presented of the spatial structure of hexadecaisoleucinomicin cyclo [-(D-Ile-Lac-Ile-D-Hyl)₄ -] by theoretical conformational analysis. This compound is a cyclic depsipeptide ionophore of the valinomycin type.

Machine analysis of 4,950 conformational approximations of the model compound constructed from tetradepsipeptide fragments allowed selection of only 43 probable structural versions for subsequent local minimum search procedures, representing distances between ends of the chain of less than 2 Å and relative values of E_{TOT} of not over 10,000 kcal/mol. The calculated energy and conformational parameters of the 12 most probably conformations are presented. Final selection of the spatial structure of the ionophore was based on the 12 possible conformational states of the main chain of the molecule. In the free state, the ionophore adopts an extended conformation stabilized by 8 intramolecular 4-to-1 hydrogen bonds with double axial symmetry and free estercarbonyls turned inward. Figures 5; references 17: 8 Russian, 9 Western. [1511-6508]

BIOPHYSICS

UDC 612.359.014.21:612.262]:612.6

REMOTE OPTICAL INTERACTION OF MITOCHONDRIA THROUGH QUARTZ

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 6, Jun 84 (manuscript received 12 Jul 83) pp 675-677

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[Abstract] A study is presented of the remote interaction among mitochondria separated by a quartz barrier. The effect of interaction was estimated by the change in rate of oxygen consumption of the mitochondria. Mitochondria were taken from a rat liver by differential centrifugation at -4°C . The mitochondria were resuspended in 0.25 M sacharrose and twice centrifuged at 14,000 g, 10 minutes each time. Mitochondria in the inner and outer cells of the experimental installation interacted through a quartz wall 1 mm thick. The results produced indicate that there is remote interaction between mitochondria separated by a quartz barrier. The remote interaction is manifested as a reliable decrease in consumption of oxygen of mitochondria in optical contact with other mitochondria. It is suggested that individual UV quartz are generated in the process of metabolism by the mitochondria. Figures 3; references 12: 8 Russian, 4 Western.
[882-6508]

UDC 615.451.234.012

PRODUCTION OF LIPOSOMES BY PHASE INVERSION AND FREEZING-THAWING

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 97, No 8, Aug 84 (manuscript received 21 Apr 83) pp 249-252

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[Abstract] The characteristics are determined of liposomes produced by a modified method involving phase inversion and cryolytic processing, and a comparison is presented of the inclusion of various types of water soluble complexons in the liposomes--trisodium calcium salt of diethylenetriaminopentaacetic acid labeled with carbon 14 (^{14}C -DTPA), used for extraction of certain highly toxic radio-nuclides from the organism. Liposomes were formed from an

equimolar mixture of phosphatidylcholine and cholesterol on 75 mM Na₃Ca-¹⁴C-DTPA. Comparison of inclusion of ¹⁴C-DTPA in liposomes of various types shows that made by the new method contain 2 to 3 times more complexon than other types of liposomes, while liposomes with negative surface charge (steric acid) contain 20 to 25% more than neutral liposomes. Treatment with ultrasound is found to be unnecessary in phase inversion. The freezing-thawing method helps to transform the amorphous gel-like system formed at high concentrations of lipids after phase inversion to a suspension of liposomes containing 10 to 14 μ l aqueous phase per μ mol of phospholipid. Figures 2; references 8: 2 Russian, 6 Western.
[1512-6508]

BIOTECHNOLOGY

PROSPECTS FOR GENETIC ENGINEERING

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 25 Oct 84 p 4

[Article by Vaskhnil Academician A. Sozinov: "A Look into the 21st Century. The Genetic Revolution Is Only Beginning"]

[Text] Today the tree of genetics has already begun to bear abundant fruits. For example, the isolation and adoption of genes of dwarfism has provided for the rapid spread throughout the world of short-stalk, standing grasses capable of yielding a grain harvest of up to 100 quintals per hectare. Using methods of genetics, it has been possible to obtain a multitude of hybrids of corn, sorghum, rice, sunflowers, and also chickens, hogs, and mulberry silkworms, which yield millions of tons of additional produce every year. The first type of crop plant created by man has come out in the fields--triticale, whose cells contain chromosomes of rye and wheat. Varieties of plants have been created too, and also strains of microorganisms which are high producers of biologically-active substances, including antibiotics and vitamins. A new field of science has arisen--genetic engineering.

But, despite these successes, I am prepared to assert that the genetic revolution is only beginning. In the near future, I hope, genetics will be able to resolve the problem of purposefully transferring individual genes or gene complexes from one organism to another. This will make it possible to construct new forms of plants and animals adapted to the industrial processes of producing food and raw materials for industry. These will be organisms substantially different from those we have now: for example barley which can fix atmospheric nitrogen, grow in acidic soils, and synthesize in the grain a complete protein equal in quality to the proteins in soy. Or a plant which accumulates so much biomass during the vegetation period in the middle region of the USSR that it would be economically feasible to transform it into industrial alcohol suitable for use as fuel. New forms of animals will also be created which require much less feed than present ones to produce livestock goods. Finally, many industrial tasks will be resolved on the basis of biotechnological processes. And even the enrichment of ores will be carried out using specially constructed strains of microorganisms.

12255

CSO: 1840/1565

IMMOBILIZATION OF N-ACETYLMURAMOYL-L-ALANYL-D-ISOGLUTAMINE ON POLYACRYLAMIDE

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 10, No 8, Aug 84
(manuscript received 30 Mar 84) pp 1119-1126

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[Abstract] N-Acetylmuramoyl-L-alanyl-D-isoglutamine is the minimum immunoactive fragment of bacterial cell wall peptidoglycans. This article deals with the synthesis of N^1 - (N-acetylmuramoyl-L-alanyl-D-isoglutaminy) - N^6 - acryloyl hexamethylene diamine (I) and its copolymerization with acrylamide, resulting in immobilization of the compound on the polyacrylamide. Compound (I) is selected because it allows bonding of the compound to the polymer at the C-terminal amino acid, the method yielding the greatest probability of preservation of the immunostimulating activity. Satisfactory results were obtained at ratios of the active MDP ester and TFA - hexamethylene diamine of 1:2.5 - 1:3.0, producing the monomer with a yield of about 70%. Copolymerization of the monomer and acrylamide was performed in a chain transfer reaction using cysteine as a polymerization limiter and ammonium persulphate as the initiator. The apparent mean molecular masses were determined for the polyacrylamide, copolymer I: 44 and copolymer I: 7 as 70, 85 and 135 kDa, corresponding to a degree of polymerization of about 10^3 . Figure 1; references 29: 5 Russian, 24 Western.
[1511-6508]

PROPORTION OF FEMALES REFERABLE TO DIFFERENT PHYSIOLOGICAL GROUPS IN
BLOOD-SUCKING MOSQUITO POPULATIONS OF SOUTH YAMAL

Moscow ZOOLOGICHESKIY ZHURNAL in Russian No 6, Jun 82 (manuscript received
26 Apr 82) pp 853-858

[Article by N. V. Nikolayeva, Institute of Plant and Animal Ecology, Ural
Science Center, USSR Academy of Sciences (Sverdlovsk)]

[Text] Data are given on incidence of females that have laid eggs once among attacking mosquitoes of three *Aedes* species. The share of females that had laid eggs ranged from 38 to 84% in different years among *A. communis* females, 44 to 88% among *A. hexodontus* and 17 to 90% among *A. pullatus*. There is discussion of the ratio between females with autogenic and nonautogenic development of ovaries among attacking and reproducing mosquitoes. Changes in proportion of physiological groups of females lead to change in contribution of females with autogenic development of ovaries to overall population fertility.

Females differing in physiological age are usually encountered in populations of blood-sucking mosquitoes. Data pertaining to proportion of females that have laid eggs once or more times are used extensively to assess reproduction and epidemiological hazard of mosquitoes. Studies of the physiological structure of Culicidae populations became more frequent thanks to introduction of a standard method, which was developed by Detinova (1945, 1947, 1962) for *Anopheles maculipennis messeae* Mg. It was later determined that the share of egg-laying females was 45-71% (Panday, 1975) in populations of several species of *Culex* from the savannas (Surinam). In *Anopheles darlingi* Root (Brazil), most of the population consisted of nonreproducing females and one-third were females that had laid eggs 1-3 times (Charlwood, 1980). Experiments with release of mosquitoes in Florida revealed that no more than 17% of *Aedes aegypti* L. and 25% of *Culex pipiens quinquefasciatus* Say females laid eggs well (Seawright et al., 1977).

In the central zone of the USSR, *Aedes* females of univoltine species are capable of completing a maximum of 4-6 gonotrophic cycles; however, the vast majority of mosquitoes have time for no more than 1-2 cycles. In districts near Moscow, where populations of *A. communis* Deg. have a 2-month flying period, 43% of

the females laid eggs, and only 7.6% of this number laid eggs twice (Shlenova, 1959). In the same species in the region of Murmansk, 49% of the females reproduced in 70-80 flight days; 34% of them completed 2 gonotrophic cycles (Sharkov, 1980). The physiological composition of females is rather stable from year to year in mosquito populations (Ebsary, Crans, 1977; Gozhenko, 1980).

Our objective here was to determine the proportion of females differing in physiological age in populations of three widely represented *Aedes* species in South Yamal. Since there can be autogenic development of the ovaries in some females, we had to estimate their share in the population. We also studied the effect of some ecological factors on physiological composition of attacking females and success of reproduction.

The studies were conducted in 1973, 1974, 1977 and 1979 in a section of a floodplain pine and birch forest in the central reaches of Khadytayakha River (67°20' north latitude). We previously described vegetation, distribution of larvae in bodies of water and conditions of their development (Nikolayeva, 1980a). An entomological net was used to catch specimens daily in 5-7 points in the section for 1 min to estimate the number of mosquitoes that attack man. After determining the species composition, we calculated mean number of attacking females of each species over 5-day periods (Nikolayeva, 1980). Concurrently with the use of the net for estimates, we caught attacking mosquitoes in a test tube for dissection. The proportion of species among attacking females caught with the net and test tube was the same (we identified more than 10,000 specimens). We started to dissect attacking females 2 weeks after mass-scale hatching from pupae, and we did so regularly for 10-12 days. Physiological age was determined on the basis of the condition of the tracheation system of the ovaries, from which eggs had been deposited, and "autogenic" females were identified by the condition of gastric trachea (Detinova, 1962). In all, we dissected 1900 *A. communis*, *A. hexodontus* Dyar and *A. pullatus* Coq females.

The seasons differed appreciably in weather conditions, which affected attacking activity and rate of mosquito reproduction (Table 1). Because of the abnormally high temperatures in the spring of 1977, pupae hatched 18-22 days earlier than normal. However, subsequent drop of mean daily air temperature to 1.5-2.5° caused the mosquitoes to stop flying for 10 days (from 16 to 25 June). Peak period of mass-scale flight that year was referable to the first 10 days in July. In the other seasons, active attacking and reproduction were observed in the second and third thirds of July, while in early August there was already high mortality among females.

When kept in confinement, female *Aedes* lived for 16 to 36 days. Egg maturation occurred at the same rate in case of autogenic or nonautogenic development of *A. communis* females, ending on the 10th-15th day, depending on temperature (Nikolayeva, 1975). When weather conditions were favorable and sources of nutrition were available, most *A. communis* females started sucking blood on the 3d-5th day after hatching (Voložina, 1961). Evidently, in the case of

autogenic development, the females complete their first oviposition within a shorter time, and some of them can go through a second ovarian cycle before the end of the season. The temperature was suitable for second oviposition in 1974; however, neither in that or other seasons were we able to find females that had undergone two ovipositions among the dissected specimens.

Table 1. Some characteristics of seasons in which studies were made

| | 1973 | 1974 | 1977 | 1979 |
|-----------------------------------|--------------|----------|---------|--------------|
| Date of hatching from pupae | 19.VI-11.VII | 5-20.VII | 8-22.VI | 25.VI-10.VII |
| Flying and attacking period, days | 59 | 52 | 50 | 40 |
| Mean temperature in July, °C | 12.3 | 16.4 | 14.7 | 13.5 |
| Precipitation in July, mm | 90.7 | 32.2 | 41.8 | 67.3 |
| Mean wind velocity in July, m/s | 6.0 | 3.8 | 3.4 | 5.2 |
| Number of host animals: | | | | |
| hares* | 8 | 7 | 13 | 35 |
| birds, pairs** | 86 | 40 | 14 | 63 |

*Number of hares was estimated visually on a section of 30-km river bank (Malafeyev, 1980).

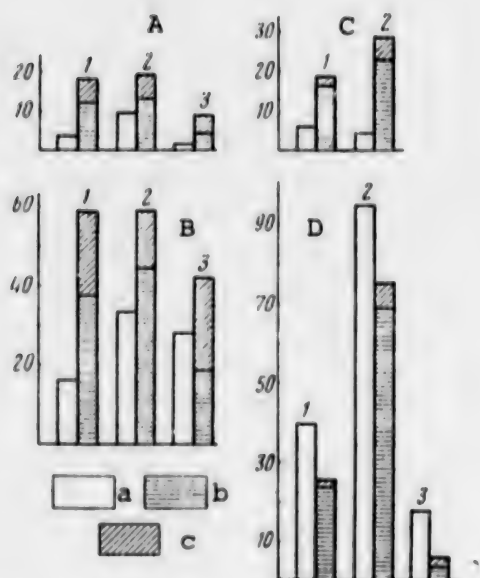
**Number of birds in a section of floodplain forest 13 ha in size was taken from Ryabitsev's data (1975)

Table 2. Incidence of females with autogenic development of ovaries among attacking and reproducing mosquitoes

| Species | Number of dissected females | Number of reproducing females | "Autogenic" females | | |
|----------------------|-----------------------------|-------------------------------|---------------------|---------------------|-----------------------|
| | | | number | % of those dissect. | % of reproducing ones |
| 18—28.VII 1973 | | | | | |
| <i>A. communis</i> | 99 | 83 | 55 | 50 | 66 |
| <i>A. hexodontus</i> | 215 | 144 | 94 | 44 | 65 |
| <i>A. pullatus</i> | 20 | 18 | 9 | 45 | 50 |
| 16—25. VII 1974 | | | | | |
| <i>A. communis</i> | 106 | 84 | 52 | 49 | 62 |
| <i>A. hexodontus</i> | 150 | 96 | 70 | 47 | 73 |
| <i>A. pullatus</i> | 20 | 12 | 5 | 25 | 42 |
| 6—17.VII 1977 | | | | | |
| <i>A. communis</i> | 218 | 171 | 144 | 66 | 84 |
| <i>A. hexodontus</i> | 228 | 198 | 153 | 67 | 77 |
| <i>A. pullatus</i> | 9 | 6 | 3 | 33 | 50 |
| 16—28. VII 1979 | | | | | |
| <i>A. communis</i> | 159 | 61 | 55 | 34 | 90 |
| <i>A. hexodontus</i> | 447 | 197 | 182 | 41 | 92 |
| <i>A. pullatus</i> | 47 | 8 | 7 | 15 | 87 |

The dissection findings are listed in Table 2. The share of reproductive *A. communis* females was stable (78–84%) in 1973, 1974 and 1977, and it dropped to 38% in 1979. In the *A. hexodontus* population, it varied insignificantly (from 64 to 88%) for the first 3 seasons, then also dropped in 1979, to 44%. In *A. pullatus*, the share of such females was largest in 1973 (90%), dropping to 60 and 67% in the next 2 seasons and 17% in 1979.

In order to assess the intensity of mosquito reproduction in different years, we extrapolated the percentile proportion of egg-laying and nonlaying females to the mean number of attacking specimens of each species (according to estimates made with use of the net). As can be seen in the Figure, while there was a



Number of females in different physiological groups among attacking mosquitoes: y-axis, number of mosquitoes (specimens/count)

- 1) *A. communis* 3) *A. pullatus*
- 2) *A. hexodontus*
- a) nonreproducing
- b) oviposition, autogenic development
- c) same with nonautogenic development
- A) 1973 C) 1977
- B) 1974 D) 1979

strong similarity of percentile ratio of *A. communis* females of different physiological ages for the first 3 seasons, the number of reproducing specimens in 1974 was 3 times greater than in 1973 and 1977. The number of such females among *A. hexodontus* was also 2–3 times greater in 1974, and for *A. pullatus* even 6 times greater (in 1977, attacking specimens of this species constituted only 2/count, and for this reason are not included in the Figure). In 1979, in spite of the substantial change in percentile proportion of egg-laying and nonlaying females, the number of reproducing *A. communis* specimens was similar to the analogous indicator for 1972 and 1977, but 5/12ths the number in 1974. Among *A. hexodontus*, the number of attacking and reproducing females was 2.6–3.9 times greater in 1979 than in 1973 and 1977, and insignificantly greater than in 1974. In *A. pullatus*, the number of attacking and reproducing females was 6 and 12 times higher in 1974 than in 1973 and 1979, respectively.

Mosquito reproduction was best in 1974 and 1979; as a result, the number of new-generation larvae increased by 2.5 times in 1975, reaching the maximum for the locality in question, whereas in 1980 [sic] the level was just as high as in 1979. Mosquito reproduction in 1973 and 1977 was not associated with increase in number of larvae in the next genera-

tions (Nikolayeva, 1981). The number of attacking mosquitoes in the floodplain is determined both by original quantity when hatched from reservoirs and weather conditions.

In comparing the 1974 and 1979 conditions, it was difficult to determine all of the causes for reduction in reproducing females among attacking mosquitoes in the second season. Yet the initial population size was considerably larger in 1979 than 1974: twice as large for *A. communis* and *A. hexodontus* and 13 times more for *A. pullatus* (Nikolayeva, 1980a). According to the Figure, only the number of attacking *A. hexodontus* females increased in 1979 consistently with growth in initial number of imagoes whereas it was disproportionately small for *A. communis* and particularly *A. pullatus*. Evidently, the decline in attacking activity and slower rate of reproduction of *A. communis* and *A. pullatus* females are related primarily to the moderate (as compared to 1974 and 1977) air temperature and rather strong winds (Table 1). According to our observations, the 4° elevation of mean air temperature in July 1974, as compared to 1973, was associated with 5.6-fold increase in number of attacking females, the initial population size being the same in both seasons.

Thus, due to the low attacking activity, the number of successfully reproduced *A. communis* and *A. pullatus* females was considerably smaller than would have been possible in the second and third 10-day periods of July 1979. Nevertheless, reproduction of all 3 species of mosquitoes was successful in 1979 due to the initially large populations. In addition, in the first half of August there were beneficial meteorological conditions: mean daily air temperature was 12.7°, precipitation constituted 40 mm and mean wind velocity was 2.8 m/s. Evidently, this was instrumental in additional reproduction of some females among those that did not lay eggs (see Figure).

The data in Table 2 indicate that there was an appreciable change in 1979 in proportion of females with autogenic and nonautogenic development of ovaries among reproducing mosquitoes of all species. The share of "autogenic" females increased from 62-84 to 90% among reproducing *A. communis*, from 65-77 to 92% among *A. hexodontus* and from 42-50 to 87% among *A. pullatus* ($p = 0.001$). The changes in proportion between physiological groups of reproducing females resulted in the fact that there was change, from season to season, in relative contribution of "autogenic" and "nonautogenic" specimens to overall fertility of the population. Thus, the potential individual fertility of the former constituted a mean of 34.7 ± 1.9 eggs and for the latter (satiated with blood), 64.5 ± 4.0 eggs in 1974 (Nikolayeva, 1981). These figures did not change reliably in 1979: fertility of "autogenic" females constituted a mean of 35.7 ± 1.1 eggs and of "nonautogenic" ones, 63.3 ± 2.6 eggs. There being a certain proportion between these forms among reproducing females (Table 2), 4602 eggs were deposited per 100 specimens in 1974: 2151 (46.7% of the total) by "autogenic" females and 2451 (53.3%) by "nonautogenic" ones. In 1979, 3846 eggs were deposited per 100 reproducing females: 3213 (83.5% of the total) by "autogenic" females and 633 by "nonautogenic" ones (16.5%).

It can be stated that the drastic reduction in reproducing females in 1979, at least among *A. communis*, occurred because of the low rate of reproduction of "nonautogenic" specimens. This was a rather unexpected finding, since the number of animals as potential food sources for mosquitoes was high that season, while development of offspring of passerine birds and hares, which are subject to mass-scale attacks, occurred at the usual times. In discussing the relatively low attacking activity of *A. communis* and *A. pullatus* females, we had already voiced the assumption that the moderate air temperature in

that period had a limiting influence. However, equally low temperatures and the strong winds in 1973 did not have an analogous effect on reproduction of expressly nonautogenic females. The possibility cannot be ruled out that there was a decline in aggressiveness of mosquitoes in 1979 for endogenous causes.

It is important to note that the increase in 1979 in share of autogenic females among *A. communis* and *A. pullatus* that had deposited eggs was unrelated to change in initial proportion of autogenic and nonautogenic forms in the populations of these species. Dissection of specimens caught at the pupa stage from diverse bodies of water in the biocenosis studied, which were then maintained in captivity, revealed that the share of autogenic *A. communis* females was 30% in 1979 and for *A. pullatus*, 21% (Nikolayeva, 1982). In 1973, "autogenic" females in the *A. communis* population initially constituted 32%, and in the *A. pullatus* population, 20%; in 1974, the share of such females in these 2 species was 37 and 10%, respectively, of the number of dissected mosquitoes (Nikolayeva, 1975). Among the dissected *A. hexodontus*, "autogenic" females constituted 33% in 1973, 37% in 1974 and it is unlikely that their relative profusion changed in 1979. But, even without an increase in fertility and share of "autogenic" specimens in the population, their adaptive role increased in population reproduction in 1979 due to increase in their initial number concurrently with increase in overall size of populations of all species studied.

As can be seen in Table 2, in prior seasons (before 1979), the share of "autogenic" females among mosquitoes dissected during the period of mass-scale attacks was always larger than the initial level, i.e., when the mosquitoes flew away from reservoirs. This could be due to two causes: 1) faster migration of "nonautogenic" females from the territory studied; 2) higher survival rate for "autogenic" females. There are no strict quantitative data concerning mortality rate of females in the populations studied. It would be logical to assume that "autogenic" females, whose ovaries start to develop immediately after their wings are formed are in less danger of perishing than nonautogenic ones, which have a more active life style because of searching for prey. The 1977 data serve as indirect confirmation of this: as a result of the severe temperature drop when they hatched from pupae and subsequent drought during the flight period, there was a high mortality of mosquitoes, which was associated with the most significant increase (up to 66-67%) in share of "autogenic" females among attacking *A. communis* and *A. hexodontus*. In 1979, there were virtually no changes in proportion of "autogenic" and "nonautogenic" females of all 3 species in the last 10 days of July. In our opinion, this is indicative of qualitative specificity of reactions to environmental factors in "autogenic" and "nonautogenic" females of that generation of mosquitoes.

The results of this investigation indicate that the proportion of different physiological groups of *Aedes* females could be quite constant for several seasons with noticeably varying weather conditions, difference in abundance of host animals and dissimilar number of mosquitoes. On the other hand, drastic changes are possible in proportion of females with autogenic and nonautogenic development of ovaries, due in part to the effect of weather factors

on flying and attacking activity. Changes in proportion of different physiological groups of attacking females lead to change in contribution of specimens with autogenic and nonautogenic development of ovaries to the overall fertility of the population.

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NORWAY RAT (*RATTUS NORVEGICUS*) COLONIZATION IN NORTH KAZAKHSTAN

Moscow ZOOLOGICHESKIY ZHURNAL in Russian No 6, Jun 84 (manuscript received 3 Jan 83) pp 898-903

[Article by A. N. Kozlov, Lipetsk Affiliate of All-Union Scientific Research Institute of Veterinary Sanitation]

[Text] Analysis is made of colonization of Northern Kazakhstan by the brownrat from the start of development of this virgin land (1954-1980). Rats have settled actively along rivers, gullies and roads from the west--Orenburg and Chelyabinsk oblasts--and from the north--Kurgan, Tyumen and Omsk oblasts. The rate of their spread constituted 6-10 to 30-40 km per year.

There are quite a few publications touching upon the question of distribution of the brown[or Norway] rat in Kazakhstan (Kuznetsov, 1948; Gruzdev, 1959; Afanas'yev, 1960; Borisenko, 1969; Kozlov, 1979, and others). However, there is only fragmentary information about North Kazakhstan. The monograph, "Mammals of Kazakhstan" (1977) does not fill this gap.

We studied the distribution of brownrats in 1967-1980 by means of inspection of many regions in all five oblasts of North Kazakhstan; we used the material kindly furnished to us by the zoologist, N. P. Kozlov, who had worked in this zone since 1957, as well as data from the veterinary, sanitary and epidemiological services, and results of questioning the public. In order to determine the rate of colonization of rats, routes of penetration into populated areas and distinctions of colonization in new sovkhoses, we conducted observations situated on the boundary of their range. To ascertain the time of appearance of rats in each of the inspected populated centers, we questioned several people and considered the answers only when at least 3-4 people gave similar answers.

During the period of our study, we inspected 217 cities and sovkhos settlements, about 400 field camps of brigades, analyzed data from the veterinary, sanitary and epidemiological services, and gathered more than 2000 questionnaire data. The collected material consisted of 26,000 brown rats.

After generalization of our material and comparing it to data in the literature, we tried to demonstrate in detail the process of brownrat colonization on the territory of North Kazakhstan from the time this virgin land started to be developed through 1980.

According to the records of sanitary and epidemiological stations and answers of long-time residents, before the development of the virgin land the brown rat was encountered in North Kazakhstan only in a few regions in its northern part. Colonies were found along the Transsiberian Railroad, in the northern part of Kustanay Oblast and some settlements along the banks of the Irtysh River.

With the start of intensive development of the vast steppes in this zone in 1954, in the place of previously barren territory numerous new sovkhos villages, livestock buildings, field camps, granaries and food storehouses emerged, which served as support centers in rat colonization.

There were also many other factors that were favorable for rapid reproduction, high survival rate and successful colonization of these rats. Establishment of large, multisector sovkhoses, intensive growth of grain and livestock farming provided favorable feed and shelter conditions for the rodents. In addition, during the early years of appearance of the rats, organization of rat exterminating work was inadequate at the sovkhoses in North Kazakhstan. For this reason, the number of rodents grew very rapidly in new settlements. Mass reproduction of the rodents was observed in many sovkhoses. Occasionally, after effective extermination of rats from only a single pig pen, up to 700 and even 1200 rat cadavers were picked up from the floor. The enlargement of the network of railroad tracks and highways within the zone and intensive hauling of freight provided conditions for passive colonization of rats. It was noted that isolated rats were brought to new sites with straw in years of drought, when there was considerable hauling of rough feed between oblasts. Moreover, isolated Norway rat specimens could have been brought to North Kazakhstan from other parts of the country. According to railroad workers, nests of rats and live animals were occasionally encountered when unloading freight cars, within the walls of "Finnish houses", in bales of pressed and other freight.*

Under such conditions, these rats spread very rapidly, occasionally up to 30-40 km per year. The rodents, arriving simultaneously in several regions and reproducing rapidly, could start several colonies at the same time, which grew and, in their turn, became new propagation centers. As a result of migrating from new, as well as old colonies, where rodents were before land development began, the range of the brown rat broadened rapidly. In recent years, thanks to improvement of sanitary and technical condition of livestock buildings and the rat exterminating service, there has been some reduction in rate of spread of the rats.

Active brown rat colonization in North Kazakhstan proceeded from the west and the north. The fact that there had already been rats in livestock buildings in the northern part of North Kazakhstan Oblast already in the 1940's, whereas they first appeared in such buildings in the northern part of Kokchetav Oblast in 1954-1958 is proof that the rats migrated from the north. The data of Gruzdev (1959), who wrote, on the basis of a report by L. V. Zhnikrup, that rats spread in Krasnoarmeyskiy Rayon of this Oblast from the railroad station in 1952 confirm the time of brown rat colonization in northern Kokchetav Oblast.

*Finnish houses--pre-fab wooden houses from Finland.

According to the results of questioning employees, rats have been encountered at railroad warehouses in Petropavlovsk since the Civil War. In 1941-1942, they did much damage at the Petropavlovsk Meat-Packing Plant, and after the war they were found in suburban private farms.

There had been no rats in Kokchetav before development of virgin land. They began to be encountered in that city, in warehouses and shops, in the mid 1950's. In 1959-1961, there were already rats in both the southwestern part of Kokchetav Oblast and in its easternmost region. From there, they began to colonize in adjacent regions of Pavlodar, Tselinograd and Turgay oblasts in the late 1950's to early 1960's.

Rats appeared in 1958-1960 in farms of Irtyshskiy Rayon in Pavlodar Oblast, on the boundary of Kzyltusskiy Rayon. Rats appeared in northeastern regions of Pavlodar Oblast in late 1950 to early 1960. But apparently, they got there from Novosibirsk Oblast.

The range of the brown rat extended from Kokchetav Oblast in a solid front to the south. Rats appeared almost simultaneously in 1960-1961 in northern farms of Yesilskiy, Zhaksynskiy and Balkashinskiy rayons.

It took the rodents 15-16 years to overcome a distance of 80-90 km in Balkashinskiy Rayon from the northwestern to southeastern and eastern parts of Balkashinskiy Rayon. The Shchuchinskiy Forest prevented penetration of the rats into northeastern sovkhoses of this rayon from the north. So far, there are no rats in farms of Shchuchinskiy Rayon, Kokchetav Oblast bordering on Balkashinskiy Rayon on the east and northeast, as well as in Makinskiy and Marinovskiy rayons of Tselinograd Oblast. Evidently, the forest served as an obstacle there for their further colonization.

Rats migrated to southern farms in Balkashinskiy Rayon and bordering sovkhoses in Atbasarskiy Rayon along the Zhabay River and its tributaries, moving from one sovkhos to another. Two neighboring sovkhoses (along the Zhilanda River) were the first to be colonized simultaneously in Atbasarskiy Rayon (in the fall of 1965). As a result of regular extermination measures at these sovkhoses further expansion of the range of these rats was arrested for almost 4 years, and the rodents got to the Sadovyy Sovkhos, 18-20 km south along the same river, in the fall of 1970. The Krasnyy Mayak Sovkhos was the last farm in Atbasarskiy Rayon to be colonized by this rat (in 1976). For the time being there are no rats in the southernmost sheep ranches, the Sochinskiy and Yuzhnyy sovkhoses. Thus, the rats traveled a distance of more than 150 km, from north to south, in 15 years.

It must be noted that there had also been accidental transportation of rats to this zone even before the virgin land started to be developed. For example, isolated rats had been encountered in 1939 at the Atbasar Station, according to railroad workers, during construction of the Akmolinsk-Kartaly Railroad, but they did not settle there, at least none was found after the war in this settlement. Colonization in the city of Atbasar by rats occurred as a result of active migration.

A few rats began to be encountered in Yesil (at a slaughterhouse and bakery) in 1963, but they colonized in the entire city only in 1974-1975. There was faster colonization along the right bank of the Ishim River in Yesilskiy Rayon. Migrating in 1960 to the Kalachevskiy Sovkhoz from Tainchinskiy Sovkhoz, they then spread to the south. Having traveled 60 km in only 3 years, the rats settled in pigsties at the southernmost sovkhos in Yesilskiy Rayon, the Komsomol Sovkhoz, in the fall of 1963. The rats' further migration to the south slowed down somewhat, and they colonized in the northern sovkhoses of Zhanadalinskiy Rayon, which are situated along the Ishim River that separates this rayon from Derzhavinskiy Rayon, in 1971-1974. Evidently, the cause of slower spread of the rats was the fact that the floodplain of the Ishim River had become overgrown with dense grass and shrubs over a width of several kilometers.

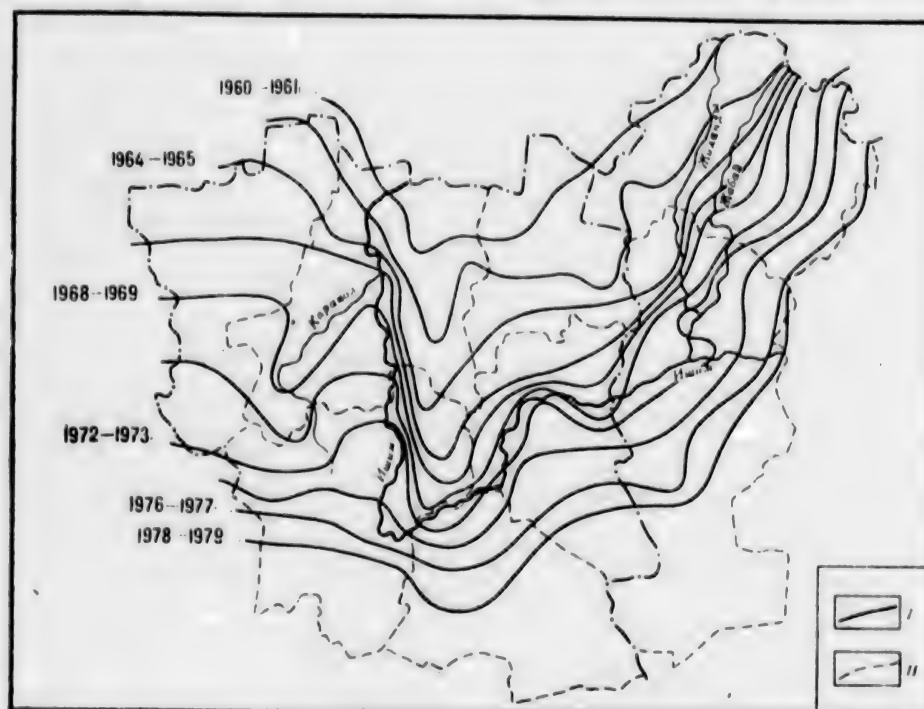
The sovkhoses imeni Lenin's Komsomol and imeni Furmanov in Zhanadalinskiy Rayon were the last southern farms to be colonized by the rats in 1978-1979. There are no rats yet at sovkhoses south of there, although some of them do raise swine.

There were distinctions to the distribution of rats along the left bank of the Ishim River. Thus, rats appeared almost simultaneously in 1968-1969 at 7 sovkhoses along the Karakol River over a distance of more than 60 km (south-west of Yesil). Perhaps, the rodents got into some of these farms in straw transported there at that time from other farms. Subsequently, these sovkhoses could have very rapidly become additional colonization centers.

The rats settled in the extreme southwestern part of Yesilskiy Rayon, at the Alma-Ata Sovkhoz, in the spring of 1970. From there, traveling 18 km along Karakol River, they reached a section of the Don Sovkhoz in the northwestern part of Derzhavinskiy Rayon in 1971, and in autumn of 1972 they appeared in pigsties in the central farm of this sovkhos, which is 20 km from the former location.

Rats colonized other sovkhoses in Yesilskiy and Derzhavinskiy rayons along the banks of Ishim River also as a result of active spread along this river. Rats appeared at the Kurskiy Sovkhoz (south of Yesil) in the fall of 1970, and they were first detected in structures on the river bank (on the edge of the town) and, concurrently, in a pigsty closest to the river on the opposite side of the town. The following year, the rats had traveled 18 km in the summer and appeared in the neighboring Dvurechnyy Sovkhoz (first also on the edge of the town, on the side of the Kurskiy Sovkhoz, in a poultry yard on the river bank). By the fall of 1972 they had advanced another 19 km along the Ishim River and colonized the pigsty of the Pyatigorsk Sovkhoz in Derzhavinskiy Rayon, and 2 years later they were in the neighboring Otradnyy Sovkhoz. Interestingly, the village of Kenskiy Elevator (through which a railroad and highway pass from Yesil to Arkalyk), which is 10 km west of the central farm of Otradnyy Sovkhoz, was colonized by the rats only in 1977, whereas they had traveled a distance of about 50 km to the south of Otradnyy Sovkhoz, along the Ishim River, to Derzhavinsk in the same period of time (1974-1977). This confirms once more that rats migrate actively at a faster rate and with greater success along rivers.

The Figure illustrates in chronological order the process of brown rat colonization in Oktyabrskiy, Yesilskiy, Derzhavinskiy, Zhana-Dalinskiy, Kiyminskiy, Zhaksynskiy, Atbasarskiy and Balkashinskiy rayons.



Brown rat colonization in northern Turgayskaya Oblast and adjacent rayons of Tselinograd Oblast

- I) boundary of brown rat distribution in different years
- II) boundaries of rayons

In these rayons, for the last 17-18 years the rats have gradually colonized the northern, most densely inhabited territory with a significant number of swine-breeding farms. Their further spread to the south, into dry regions with prevalence of pasture and range type cattle farming, was slower. There are no rats in the southern sheep-farming regions.

In Kustanay, rats were first observed at the oblast product base in 1944-1945, whereas they only appeared in the 1960's at farms in Kustanayskiy Rayon. For example, rats have been found at the Sokolovskiy Sovkhoz, which is 45-50 km southwest of Kustanay, since 1960 and at the Vladimirovskiy Sovkhoz, which is 40 km north of Kustanay, since 1962-1963.

Thus, at the present time the range of this species includes most of the region we studied. As a rule, there are no rats only in southern, sparsely populated, semidesert sheep-farming rayons.

The boundary of the present distribution of the Norway rat in this region traverses the following large towns, starting with the western part of Kustanay Oblast and somewhat south of it: Dzhetyskaya--Kamyshnaya--Dokuchayevka--Derzhavinsk--Kiyma--Atbasar, then turns to the north and crosses Balkashino--

Zerendu--Shchuchinsk--Kzyltu (bypassing the semidesert region of Sileta River) and again turns to the south, where it passes through regions near the Irtysh River in Pavlodar Oblast. The central part of Tselinograd Oblast is free of rats for the time being, since the forest prevents their migration from the north and west, while the vast uninhabited rocky areas of Ekibastuzskiy and Yermontavskiy rayons of Pavlodar and Tselinograd oblasts prevent it from the east. In our opinion, it is interesting that we never encountered self-contained, isolated colonies of brown rats beyond the limits of their range in the entire period of our study.

The southern boundary of distribution of the brown rat in Kazakhstan, which was identified previously, is described in the monograph, "Mammals of Kazakhstan" (1977). It coincides, in many respects, with our data on distribution of the brown rat in North Kazakhstan in the 1960's. At the present time, the range has widened 90-120 km to the south. The authors of the above-mentioned monograph draw the boundary of the Norway rat's range through the village of Alekseyevka and city of Tselinograd, and from the latter it turns to the north. According to our data, there are no brown rats in Tselinograd or surrounding sovkhoses. For this reason, the boundary of their distribution does not turn north from Tselinograd, but from the southeastern sovkhoses in Atbasarskiy Rayon. Apparently, the reason for some disagreement between our data and those in the literature is that many publications on this subject are based on results of interrogation and various departmental sources, in which the Norway rat could have been confused with the water vole or other animal.

There are both specifics for each village and general features in the process of rat colonization.

The rat occupies entire sovkhos settlements, usually 3-4 years after they appear. If the rodents first arrive at livestock farms, they usually form colonies in the 2d year, and the number of animals becomes relatively large in this time, up to several tens or even hundreds of specimens in some buildings. The rats then migrate to ancillary structures and dwellings of a village, and colonize it in 2-2.5 years. Occasionally, rats are first found in a village, and later they penetrate into farms. It also happens that they settle in a farm and the residential sector at the same time. The rate of rat colonization in sovkhos structures depends on the distance between them, topography of the locality, as well as anthropogenic activities. For example, less than a year was required for rats to migrate from livestock structures at the Kolos Sovkhos, where they appeared in 1976, to a village only 200-250 m from the farms. At the same time, this took 3 years at the Pyatigorsk Sovkhos. Rats first appeared there in one of the pigsties in the fall of 1972. By autumn of 1974 they had colonized in all livestock structures, and in late October 1975 they were found in 8 yards in the village 1 km from the farms and separated from them by a ravine overgrown with shrubs. By the fall of 1976, the rodents had already colonized in 57 yards and, by the end of May 1977, more than 100 (there were 223 yards at the sovkhos in all). Rapid colonization of surrounding sovkhos structures is observed by rats that previously occupied livestock structures that were torn down or were being repaired, as well as after they had been flooded by melt or after a fire.

It was observed that rat mobility increased drastically 2.5-3 years after they appeared at a sovkhos (when the number of rodents becomes large), and in the summer they migrate to brigade field camps, livestock points and other seasonal settlements of people in the steppe, which are 1-8 to 20-25 km away from the central farm of a sovkhos, using them as "bases" for penetration into field camps and central farms of adjacent sovkhoses. Drastic worsening of the feed base in the fall, when people abandon field camps, serves as the stimulus for rodent migration from such camps to the closest inhabited center. Brown rats settle primarily along rivers. The initial colonization by rodents of sovkhos structures closer to a river, from which rats subsequently migrate over the entire sovkhos, proves this. Rat migration in the steppe, in the absence of rivers and ravines, apparently occurs along roads, rather than haphazardly.

One can prevent rapid colonization of structures by the brown rat by regular extermination. For example, at the Znamya Truda Kolkhoz, rats first settled in pigsties and, 3 years later, when their number was already very large, they appeared in 4 yards of the village closest to the sties, but they were exterminated. In subsequent years, rodents appeared in yards closest to the pigsties every year, and each time they were exterminated. Effective extermination was performed regularly in livestock structures. All this has prevented for over 10 years colonization of the residential sector of the kolkhoz to a significant extent. Forests present a serious obstacle to migration of rats.

Thus, Norway rats settle actively on the territory of North Kazakhstan in the steppe along rivers, ravines and roads. Bringing rats in via transport plays no appreciable role in their mass-scale colonization of new territories, since it would be necessary to bring both males and females, or a pregnant female to an area for a stable colony to be formed, and this probably happens very rarely.

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REACTION OF *Aedes aegypti* (DIPTERA, CULICIDAE) TO ODOR OF CHEMICAL COMPOUNDS AS RELATED TO ATMOSPHERIC PRESSURE

Moscow ZOOLOGICHESKIY ZHURNAL in Russian No 6, Jun 84 (manuscript received 18 Jan 83) pp 942-944

[Article by P. V. Kostin, Biological Faculty, Moscow State University]

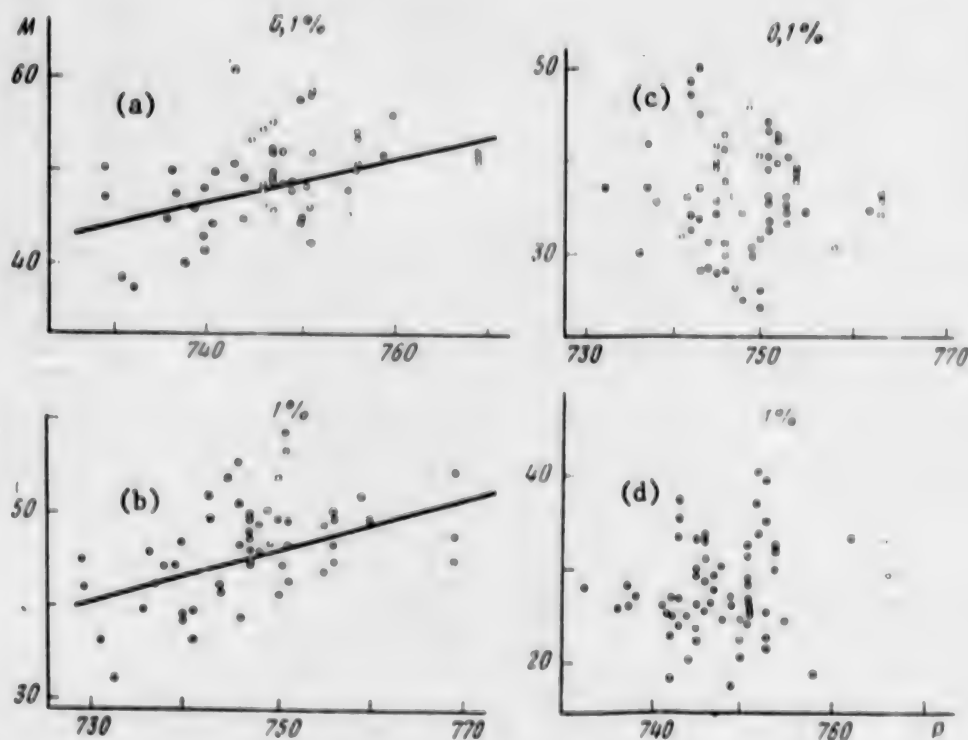
[Text] Many studies are being pursued at the present time of reactions of insects, in particular, mosquitoes, to the odors of diverse chemical compounds (Potapov, Koshkina, 1970; Smith et al., 1970; Kost et al., 1971; Varma, 1971; Latyshev et al., 1972; Yelizarov et al., 1975). Strict control of climate factors is the most important requirement for comparing results of experiments performed by different authors in the laboratory and a record of these factors is necessary in the case of field studies. Both the reaction to an odor and attack by diptera depend on many environmental factors: temperature, illumination, humidity, atmospheric pressure and others. Thus, in the field, ambient temperature and illumination have a prime influence on attacking activity of blood-sucking diptera (Chagin, 1948; Monchadskiy, 1950; Breyev, 1956, and others). Attacking activity may also depend on relative humidity and wind velocity.

Atmospheric pressure also influences diptera activity. Thus, gnats attack more willingly at dropping and low pressure (Underhill, 1940; Davies, 1952). However, no relationship was found between daily attacking activity and changes in atmospheric pressure for mosquitoes of two species of the genus *Aedes* (Wright, Knight, 1966). At the same time, it was shown that the repulsing effect of a repellent on mosquitoes decreased on days with low atmospheric pressure (Bogdanova, 1982).

Level of perturbation of the geomagnetic field could be a factor capable of influencing insect activity in the laboratory, other conditions being controlled (Chernyshev, 1968). Nor can we rule out seasonal and daily fluctuations of insect sensitivity to odors of chemical compounds. For example, daily changes in sensitivity to insecticides have been demonstrated for mosquitoes of the genus *Aedes* (Bainbridge et al., 1982).

We observed that olfactory tests of the same substance under controlled conditions yielded somewhat different results on different days. Since illumination, temperature and humidity are kept constant in laboratory experiments,

variability of mosquito reactions to odors could be due to fluctuations of atmospheric pressure, variations of geomagnetic field, as well as circadian and seasonal rhythms. We were concerned here with determination of the possible relevance of these factors to variability of olfactory reactions of mosquitoes.



Aedes aegypti reaction to odor of lactic acid (a, b) and DMP solution (c, d) as a function of atmospheric pressure (P)

- a) 0.1% acid solution ($r = 0.42 \pm 0.27$; $y = -124.03 + 0.23 P$)
- b) 1% solution of acid ($r = 0.44 \pm 0.28$; $y = -156.99 + 0.27 P$)
- c) 0.1% DMP
- d) 1% DMP
- M) coefficient of olfactory reaction, %

In the experiments, we used unfed *Aedes aegypti* L. female mosquitoes taken from a laboratory culture on the 4th-5th day after hatching from pupae. We used the olfactometric method (Tsyba, 1971), which permits examination of flying insect reactions to odors, to assess the effect of odor of a substance on the chemoreceptors of mosquitoes. A minor modification of this method consisted of the fact that the olfactometer was placed in a separate chamber, where constant humidity (close to 100%), constant temperature (26°) and constant artificial light (10 lux) were maintained.

We performed 3-4 experiments with each of the tested substances in concentrations of 0.1 and 1% each month in 1981 and first half of 1982. Measurements were taken 6 times using about 150 specimens in each experiment. The tested

substances evaporated from the surface of chromatographic paper placed in one of the chambers of the olfactometer (Kost et al., 1971). In the first series of experiments (54 tests) we used L-(+) lactic acid, which is generally considered an attractant for *A. aegypti* (Smith et al., 1970). In the second series (66 experiments), we used the repellent, dimethylphthalate (DMP) as the tested agent. We calculated the coefficient of olfactory reaction (M) to the odor of lactic acid and DMP from the results of each experiment. The value of M calculated from the results of control flight of mosquitoes in two jets of pure air is 50%. (For repellents, $M < 50\%$ and for attractants $M > 50\%$.) Data about atmospheric pressure on the days of the experiments were obtained from the meteorological station of the Timiryazev Agricultural Academy, and those about the geomagnetic field (K indexes) from the International Geophysical Center (Moscow).

Our findings enable us to assume that there is a link between atmospheric pressure and the olfactory reaction of *A. aegypti* to the odor of lactic acid (Figure, a-b).

With increase in atmospheric pressure, the attractant properties of this acid are more pronounced. This link is more marked with a 1% concentration of lactic acid than with 0.1%. At low atmospheric pressure, lactic acid is more of a repellent than attractant (M less than 40%). The dependence of level of mosquito reaction to lactic acid on atmospheric pressure is reliable ($P > 0.95$).

We failed to demonstrate a correlation between change in atmospheric pressure and olfactory reactions of *A. aegypti* to the odor of DMP (Figure, c-d). Variability of mosquito reactions to odors of both lactic acid and DMP was unrelated to state of the geomagnetic field on the day of the experiment, time of day or season.

Thus, our results indicate that the olfactory reactions of a laboratory culture of *A. aegypti* to the odors of chemicals can differ appreciably, depending on atmospheric pressure at the time of the experiment. This circumstance must be taken into consideration when conducting experiments of this kind.

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CSO: 1840/1005

ENVIRONMENT

UDC 614.7:66+628.512

HYGIENIC ASPECTS OF UTILIZATION AND PURIFICATION OF WASTE WATERS FROM ORGANIC SYNTHESIS PLANTS

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 10, Oct 84
(manuscript received 10 Jun 83) pp 57-61

BELYAYEV, I. I., (deceased), GRACHEVA, M. P., BARANOV, Ye. M. and BEZ"YAZYKOVA, A. N., Gorky Medical Institute

[Abstract] Contrary to the practices in the USA and other capitalist countries where, it is alleged, rampant pollution of water resources is the rule and little is done by the government to control such practices by monopolistic enterprises, pollution control in the USSR is a government concern and vast sums are spent to prevent pollution and clean up the environment. Such practices in the USSR are also applied to plants engaged in organic synthesis, since the waste waters are often highly mineralized and contain large quantities of various organic pollutants. Although no individual details can be provided in a general discussion, suffice it to say that underground storage [which has been practices in the USA since the thirties] and various thermal methods (liquid phase oxidation, heterogenous catalytic oxidation, flame oxidation) appear to be the most appealing. Obviously, a successful approach to decontamination of such waters and their eventual reutilization can come about only as a result of joint effort and intellectual cooperation between hygienists and public health physicians on the one hand, and engineers on the other. References 34: 30 Russian, 4 Western.
[1587-12172]

UDC 614.777:614.73]-07

SUBMERGED MACROPHYTES AS INDICATORS OF AQUATIC RADIOACTIVE POLLUTION

Moscow GIGIYENA I SANITARIYA in Russian No 5, May 84 (manuscript received 9 Aug 83) pp 87-89

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[Abstract] Studies were conducted during the period 1979-1982 on radioactive pollution of the Tashlyk reservoir (which provides cooling waters for the Southern Ukrainian Nuclear Power Station), and on Southern Bug river,

in an attempt to assess the feasibility of using hydrobionts as indicators of pollution on the basis of radionuclide uptake. Data are tabulated for Sr-90, Cs-137, Ra-226 and U accumulation in *Cladophora glomerata*, *Potamogeton filiformis*, *P. lucens*, *P. perfoliatus*, *Spirodela*, and *Thypha angustifolia*. The levels of radionuclide accumulation in *P. perfoliatus* exceeded that in the other plants at least three-fold, and the correlation coefficients between the *P. perfoliatus* levels and concentration of radionuclides in water, fish and bottom deposits varied from 0.5 to 0.8. The ratio of the significant correlation coefficient (r_s) to the critical correlation coefficient ($r_{0.5}$) in all cases was greater than unity, indicating the statistical significance of the correlations. On the basis of regression equations it is possible to determine the actual concentrations of the radionuclides in water, fish and bottom deposits from the levels determined in *P. perfoliatus*. References 6: 5 Russian, 1 Western.
[1546-12172]

UDC 614.777:628.192]:[628.19]:622.276

SANITARY INSPECTION OF DISPERSION AGENTS USE IN DECONTAMINATION OF WATER
RESERVOIRS FROM SURFACE FILM OF PETROLEUM

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 84 (manuscript received
19 Jan 84) pp 64-66

GALIYEV, M. A. and ODINTSOVA, A. G., Ufa

[Abstract] Presence of a petroleum film on the surface of water creates a serious hazard to aquatic fauna and flora as it interferes with established metabolic processes. Mechanical purification methods are ineffective because the film is very thin and covers huge areas. In recent times dispersion agents (preparations based on surfactants) became effective in treating oil films on water, although in some cases they led to undesirable organoleptic properties. The effectiveness of this method depends on the atomization of the aqueous solution of the dispersing agent. The surfactants used must be biodegradable and only after all mechanical measures of purification have been exhausted can they be applied. They should not be used in reservoirs storing drinking water. A second treatment with dispersing agents can be permitted only on reservoirs with no flow-through after a careful analysis of water.

[1549-7813]

INVESTIGATIONAL PROSPECTS FOR STUDIES OF ENDOCRINE SYSTEM OF GASTROINTESTINAL TRACT IN DEVELOPING STANDARDS FOR CHEMICALS IN DRINKING WATER

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 84 (manuscript received 15 Nov 83) pp 60-62

BONASHEVSKAYA, T. I. and CHURSOV, V. A., Scientific Research Institute of General and Communal Hygiene imeni A. N. Sysin, USSR Academy of Medical Sciences, Moscow; Kuybyshev Scientific Research Institute of Hygiene

[Abstract] This paper represents a review of pertinent literature. Studies of the mechanism of action of xenobiotics concentrate on evaluation of biological barriers. Chemicals penetrating cell barriers react with molecular, subcellular and cellular structures. One of the principal routes of entering the human body is the epithelium of gastrointestinal tract. Its endocrinologic role in this process is very important. Sixteen independent enteroendocrinologic cells were identified which synthesize serotonin, melatonin, histamine, motilin, compound P, somatostatin, ACTH, VIP, secretin, bombesin, etc. All of them have a wide range of physiological functions. Various types of endocrine cells respond to chemical stimuli. This review concentrated on enterochromaffinic cells. In addition to chemical stimuli, these cells also respond to stimulation of nerve fibers innervating gastro-intestinal tract. However, the oral route appears to be the principal access from the point of view of hygienic standardization. References 27: 19 Russian, 8 Western. [1549-7813]

UDC 614.777-07

UTILIZATION OF INTEGRATED INDICES IN DEVELOPMENT OF HYGIENIC CLASSIFICATION OF WATER RESERVOIRS BY DEGREE OF THEIR CONTAMINATION

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 84 (manuscript received 8 Feb 84) pp 11-13

NOVIKOV, Yu. V., PLITMAN, S. I., LASTOCHKINA, K. O. and KHVASTUNOV, R. M., Moscow Scientific Research Institute of Hygiene imeni F. F. Erisman

[Abstract] In setting up priorities for proposed water protective measures, the degree of the pollution must be established. Restrictions placed on consumption of water from or on recreational activity on water reservoirs may be due to four causes: unsatisfactory organoleptic quality, unsanitary conditions, excessive content of controlled toxic substances and microbial contamination. On the basis of many detailed analyses, the following individual characteristics were found to be needed in determining an integrated index (W_c) reflecting the sanitary state of a given water system: dissolved oxygen, biochemical and chemical consumption of oxygen and specific contamination above accepted standards. All individual components (δ_1) of the integrated formula were

converted to nondimensional units $\delta_1 = x_1/N_1$ where x_1 = absolute value of an individual index, N_1 = permissible standard level of a given component. The integrated formula was developed $W = \frac{1}{n} \sum_1^z (\delta_1 - 1) + 1$, on the basis of which four levels of water purity were established: permissible (W_0 up to 1 unit and no individual indices above their standards), moderate ($1 < W_0 < 1.5$ and odor < 3 units), high ($1.5 < W_0 < 2.0$, order < 4 units) and extremely high ($W_0 > 2$). References 3 (Russian).

UDC 616.056.43-02:614.71/.73

METHOD OF DETERMINING POPULATION SENSITIZATION TO AIR POLLUTANTS

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 84 (manuscript received 7 Dec 83) pp 46-47

RED'KO, L. A. and ETLIN, S. N., Scientific Research Institute of Epidemiology, Microbiology and Hygiene, EsSSR Ministry of Health, Tallinn

[Abstract] Allergologic studies of air pollutants are usually based on analysis of chemicals present in atmosphere. The principal difficulty is to find the leading causes of allergy, especially where synergistic effects may be encountered. One possible solution may be in proper collection of air samples through special filters, analysis of the extracts and isolation of the main factor. The effect of combined allergens was determined by the reaction of specific agglomeration of leucocytes (RSAL) with blood cells of individuals from another region than the one in which the air sampling was done. Benzene was identified as a possible principal allergen. Therefore, RSAL test against the combined extracted allergens and benzene was performed on 30 individuals from the air sample collection area: 12 of the individuals were positive: 8 were positive against benzene and 4 against the combined allergen. The individuals positive against benzene were negative against the combined allergen. Thus it was shown that the combined test gave a more accurate reading of the sensitization of the population. References 2 (Russian). [1549-7813]

WORK OF EPIDEMIOLOGISTS AND THEIR ASSISTANTS AT RURAL RAYON SANITARY
EPIDEMIOLOGICAL STATIONS

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 9, Sep 84
(manuscript received 28 Feb 84) pp 29-35

SPOTARENKO, S. S., doctor of medical science, professor and CHERNOVA, T. P.,
Central Scientific Research Institute of Epidemiology, Ministry of Health,
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[Abstract] A study of the work load of 5 chief physicians at grade III sanitary epidemiological stations, 15 epidemiologists and 14 assistant epidemiologists at 18 rural I, II, III grade sanitary epidemiological stations was based on actual time spent by these persons on different tasks. Little time was spent on epidemiological inspection of foci of infectious diseases: epidemiologists of grade I and grade II stations spent 13.0 percent and 10.2 percent of their annual duty time respectively on this while assistant epidemiologists of I, II, III grade stations spent 30.7 percent, 18.9 percent and 19.7 percent of their duty time respectively on this. Physicians of grade I stations inspect 10.3 percent of the cases in foci of intestinal infections in kindergartens and physicians of grade II stations oversee 30.4 percent of such cases; these figures are 12.8 percent and 16.7 percent respectively of cases in foci of virus hepatitis in schools. In rural areas served by grade III stations, assistant epidemiologists inspect 98 percent of foci of infectious diseases while chief physicians spend only 1.5 percent of their annual duty time on such cases. The greatest amount of duty time of epidemiologists and assistants was spent on surveillance of foci in schools while the least amount of duty time of physicians was spent on treatment of animal bites while assistants spent the least amount of their duty time on examining familial foci of air-borne droplet infections. References 5 (Russian).
[1553-2791]

RELIABILITY ESTIMATION OF MAJOR ELEMENTS OF INFECTIOUS AGENT CONTROL IN TECHNICAL PROCESSES SAFETY

Moscow GIGIYENA I SANITARIYA in Russian No 5, May 84 (manuscript received 22 Sep 83) pp 12-16

BORTKEVICH, V. S., MOROZ, A. G., VOTYAKOV, V.I. and PIVCHENKO, A. G., Belorussian Scientific Research Institute of Epidemiology and Microbiology, Minsk

[Abstract] An analysis was performed on the functional reliability of a technical system designed to control the spread of infectious agents. A probability of failure analysis was conducted on each of four major components of a linear microbiological safety system, consisting of primary and auxiliary power supply, ventilation and laminar flow, glove patency in safety box gloves, and chemical showers. Proceeding from actual failure rates, probability criteria were calculated which allowed assessment of equipment performance and expenditures needed to assure workers' and environmental safety. For optimum performance in such linear systems three sources of power (primary and back-up) are required, as well as careful attention to detail in the construction of negative-pressure ventilation. Figures 1; references 4: 3 Russian, 1 Western.
[1546-12172]

UDC 614.7:579.842.14]-078:616.98:579.842.14/-022.3

SURVIVAL OF SALMONELLA IN AEROSOL STATE UNDER EXPERIMENTAL CONDITIONS

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 84 (manuscript received 9 Nov 83) pp 75-77

PLAKHOTYA, L. P., Minsk Medical Institute

[Abstract] The principal route for the spread of salmonella infection appears to be the nutritional pathway. In recent years literature data suggested the possibility of aerogenic spread of salmonellosis. Salmonella appear to survive in air better than any other microorganisms. It was shown in the present study that survival of salmonella in artificially-created aerosol depended on the composition of the dispersive medium. Aerosols generated on the basis of 0.1% gelatin were 2.5-3.5 fold more resistant than those prepared from physiological solution. It was shown that 0.22-0.71% of salmonella could survive in air for up to 4.5 hrs, thus proving that they could spread the infection through air, especially in poorly ventilated space with inadequately maintained sanitary conditions. References 16: 10 Russian, 6 Western.
[1549-7813]

NEW DATA ON TICK-BORNE ENCEPHALITIS VIRUS IN PRIMORSKIY KRAY

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 5, Sep-Oct 84 (manuscript received 12 Nov 82) pp 67-70

KOLONIN, G. V., BARANOV, N. I. and GORELIKOV, V. N., Pacific Institute of Geography, Far Eastern Scientific Center, USSR Academy of Sciences; Maritime Sanitary Epidemiologic Station, Vladivostok

[Abstract] Between April 4 and June 12, 1982 a total of 5242 ticks were collected in the western and southern reaches of the Maritime Province, and subjected to standard virological techniques for detection and identification of tick-borne encephalitis virus. The data revealed 18 strains of the virus in that area. In addition, the western region of the Provinces and the Popov Island were identified for the first time as harboring the virus. The virus was frequently isolated from sparse oak forests and brushwoods, areas from which the tick-borne encephalitis virus is seldom isolated. References 2 (Russian).

[1600-12172]

UDC 576.895.42.095.38:599.32

HOST SUITABILITY OF MURINE SPECIES FOR DERMACENTOR PICTUS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 5, Sep-Oct 84 (manuscript received 19 Apr 83) pp 70-74

LEBEDEVA, N. N. and PLATOVA, O. A., Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, Moscow

[Abstract] Several murine species (*Clethrionomys glareolus*, *Microtus arvalis*, *Lagurus lagurus*, *Apodemus sylvaticus*) were tested for their suitability as feeding hosts for the Ixodid tick *Dermacentor pictus*. The resultant observations demonstrated that the field mouse (*Microtus arvalis*) and *C. glareolus* are naturally resistant to feeding by *D. pictus*, with only a limited number of ticks becoming engorged after prolonged feeding. The forest mouse *Apodemus sylvaticus* did not exhibit resistance initially, but acquires resistance in response to the tick larvae over a period of time. Subsequent feeding of *D. pictus* on *A. sylvaticus* resulted in marked size decrease of the imago and a predominance of male specimens. *L. lagurus* was observed to be highly susceptible, with the larvae developing to a larger size and showing a preponderance of females. These observations suggest that the physiological and biochemical attributes of putative rodent hosts may play a significant role in the existence of *D. pictus*. References 7: 1 Belorussian, 4 Russian, 2 Western.

[1600-12172]

INFECTIVITY OF DERMACENTOR NIVEUS BY PATHOGENIC RICKETTSIA IN AMUDARYA
FLOOD-PLAIN PRESERVE

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 5,
Sep-Oct 84 (manuscript received 20 Jul 83) pp 74-78

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Scientific Research Institute of Epidemiology and Microbiology imeni N. F.
Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] Surveillance studies on the infectivity of Dermacentor niveus by
rickettsia pathogenic for man and animals was conducted in 5 different biotopes
of the Amudarya Forest Preserve in the period 1981-1982. Using a standard
techniques of isolation and identification, the ticks were found to harbor
Rickettsia sibirica and Coxiella burnetii, with some specimens harboring
both pathogens. D. niveus was demonstrated to be capable of both transovarial
and transphasic transmission of R. sibirica, and of transphasic transmission
of C. burnetii. In view of the high population densities of D. niveus in
Amudarya in the spring and autumn, it appears that they constitute a definite
health hazard for man and animals. References 14: 12 Russian, 2 Western.
[1600-12172]

UDC 576.895.771.095.38:576.893.192.6].095.18:615.285.7

PERSISTENCE OF PLASMODIUM IN MOSQUITOES TREATED WITH SUBLETHAL DOSES OF DDT

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 5,
Sep-Oct 84 (manuscript received 3 Oct 83) pp 82-84

ZHAROVA, A. N. and RASNITSYN, S. P., Institute of Medical Parasitology and
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[Abstract] An evaluation was made of the development and persistence of
Plasmodium gallinaceum in Aedes aegypti fed on infected chicks, with subsequent
exposure of the mosquitoes to sublethal doses of DDT. Exposure of the
mosquitoes to DDT at various stages of plasmodial development had no effect
on infectivity, parasite counts, or the appearance of sporozoites. Feeding
such mosquitoes on chicks resulted in the development of clinical malaria
in the latter, indicating no loss of virulence by P. gallinaceum. References
21 (Western).
[1600-12172]

UDC 613.298:[664.8/9:667.528

HYGIENIC CHARACTERISTICS OF FL-559, FL-560 and FL-561 VARNISHES DESIGNED FOR APPLICATION IN CANNING INDUSTRY

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 84 (manuscript received 5 Dec 83) pp 21-23

PESTOVA, A. G. and KOLOMIYETS, L. S., All-Union Scientific Research Institute of Hygiene and Toxicology of Pesticides, Polymers and Plastics, Kiev

[Abstract] Varnishes prepared on phenol-formaldehyde basis (FL-559, FL-560 and FL-561) are used as surface covers for metal cans in food industry. These varnishes could leach out various monomers into the food contents in such cans. To evaluate this potential hazard, organoleptic indices of water extracts of varnished cans were determined concentrating on migration of formaldehyde, epichlorohydrin, diphenylpropane and phenol into the extracted material. The cans containing distilled water, 0.5% acetic acid, 2% salt solution and 0.5% citric acid were sterilized for 1 hr at 120°C and then stored at room temperature for 10 days. Glass jars were covered with a thin film of above varnishes and dried at 200°C for 10, 20 and 30 min, and then filled with distilled water and kept one day at 40°C. In another series, varnish covered glass jars were kept 10 min at 50, 100 and 200°C and then treated as above. A direct relationship was noted between migration of epichlorohydrin and formaldehyde and the temperature and duration at which the varnishes were treated in the preparatory steps. Minimal secretion of formaldehyde from FL-560 and FL-561 was found with a 20 min heating at 200°C. Optimal drying conditions for FL-559 called for a 10 min exposure to 200°C. References 6 (Russian). [1549-7813]

GENETICS

ARTIFICIAL INTERFERON GENE

Moscow SCIENCE IN THE USSR in English No 4, 1984 pp 36-41

[Abstract] In recent years considerable attention in the popular press has been accorded to interferon an attention primarily based on its promise in treatment of infectious diseases and cancer. However, full clinical trials are hampered by the lack of adequate quantities of interferon, and the fact that different cells produce different kinds of interferon. Recently, interferon genetics have come to the fore and biotechnology, as well as standard chemical methods, have been harnessed in the production of larger quantities of interferon. An interview with Academician M. Kolosov of the Gene Chemistry Laboratory of the Institute of Bioorganic Chemistry imeni Shemyakin of the USSR Academy of Sciences (AS) emphasized some of the important recent advances in gene synthesis conducted at that institute. M. Kolosov gave due credit to the Indian scientist K. G. Khorana, now residing in the USA, who pioneered work on gene synthesis, and to other colleagues in the USA, Britain and Japan who made significant contributions in this direction. In the USSR, the biotechnological studies are directed by Academician Yu. Ovchinnikov under the auspices of the "Artificial Interferon Gene" Program of the USSR AS. The laboratories involved in the program are the Gene Chemistry Laboratory headed by M. Kolosov, and the Novosibirsk Research Institute of Molecular Biology headed by L. Sandakhchiev, corresponding member of the USSR AS. It is claimed that one difficulty encountered in attempting a free exchange of scientific ideas with the West is that such research is hidden behind a veil of secrecy maintained by corporations with a financial interest in interferon. [002-12172]

TRANSFER MOBILIZATION OF NONCONJUGATIVE PLASMID pAP/57 Hly BY VARIOUS CONJUGATIVE PLASMIDS

MOSCOW BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 6, Jun 84 (manuscript received 10 Jul 83) pp 704-705

GIGANI, O. B. and PEKHOV, A. P., Department of Biology and General Genetics, University of People's Friendship imeni Patris Lumumba, Moscow

[Abstract] A study is made of the transfer mobility of the nonconjugative plasmid pAP/57 Hly identified in *E. coli* cells and controlling the synthesis of β hemolysine in bacteria of this species. Transfer mobility was studied in "three-parent" crossings in which the donors were *E. coli* AP115 met thi lac or J53 pro met containing one of the conjugative plasmids, the intermediate recipients were *E. coli* cells C600 thr leu thi lac rif or AB2463 rec A containing the nonconjugative plasmid studied, while the final recipients were cells of the strain *E. coli* pAP115 nal^r. Only 11 conjugative plasmids of the 23 studied (pAP41, R711b, R386, R27, R621a, R391, R387, RP4, Rts1, R905 and S-a) have the capability for transfer mobilization of the nonconjugative plasmid, the F-like plasmid pAP41 as well as R27, R387 and S-a in incompatibility groups H, K and W being most effective. It is concluded that mobilization of pAP57 does not depend on membership of the mobilizing plasmid in a given incompatibility group, nature of the determining pili or range of transmissivity. The mechanism of mobilization of the plasmid is not known. References 11: 2 Russian, 9 Western. [882-6508]

UDC 614.7:615.285.7]-07:612.6.052+615.285.7.065:612.6.052

MUTAGENICITY OF HEXACHLOROCYCLOHEXANE PREPARATION

MOSCOW GIGIYENA I SANITARIYA in Russian No 5, May 84 (manuscript received 26 Oct 83) pp 82-83

BAKHITOVA, L. M. and PASHIN, Yu. V., Institute of General Genetics imeni N. I. Vavilov, USSR Academy of Sciences, Moscow

[Abstract] A commercial preparation of hexachlorocyclohexane was tested for mutagenicity on Chinese hamster V-79 cells and, in vivo, on (CBA x C57B1/6J)F₁ mice. Analysis of induced mutations in the tissue culture (X-chromosome-linked locus for hypoxanthin-guanine phosphoribosyltransferase activity) showed a relative value of 1.3 ± 0.4 for the control cultures, 1.70 ± 0.4 for cultures exposed to 100 $\mu\text{g/ml}$ of the agent, and 4.3 ± 0.5 ($P < 0.01$) for cultures exposed to 200 $\mu\text{g/ml}$. Studies on mice treated intraperitoneally with hexachlorocyclohexane on the induction of micro-nuclei in marrow red cells, showed that the maximum number of such cells was obtained 24 h after injection, and that the percentage in experimental mice exceeded the level

in control mice 1.4-fold. These observations indicate that technical grades of hexachlorocyclohexane possess low mutagenicity in in vitro and in vivo tests, and that the techniques described here can be utilized on a wider scale in testing pesticides for mutagenic activity. References 9 (Russian). [1546-12172]

HUMAN FACTORS

UDC 613.6:612.766.1-87(049.2)

REPLY TO A. A. PROKHOROV'S COMMENTS OF G. I. KUTSENKO ET AL PAPER
"METHODOLOGY OF QUANTITATIVE INTEGRAL EVOLUTION OF FATIGUE"

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 84 (manuscript received
16 Nov 83) pp 63-64

KUTSENKO, G. I., SOSHNIKOV, Ye. I. and MINCHIN, B. N., All-Union Scientific
Research Institute of Social Hygiene and Organization of Public Health imeni
N. A. Semasko, Moscow

[Abstract] The authors are replying to some criticism of reviewer A. A. Prokhorov, challenging some statements like: "quantitative integral evolution of fatigue", "fatigue as a physiological phenomenon with parametric character" permitting "quantitative evaluation of the degree of fatigue regardless of the occupational activity leading to this state", etc. Without the benefit of the original paper and its critique these replies are non-interpretable. [The original article appeared in Gig. i san. Vol 8, 1982, pp 53-56; Prokhorov's comments, Ibid., No 8, 1983, pp 55-57] [1549-7813]

UDC 613.48:613.646]-07

HYGIENIC CHARACTERISTIC OF SPECIAL CLOTHING AND HUMAN THERMAL HOMEOSTASIS
IN RELATION TO IMPAIRED BODY HEAT LOSS

Moscow GIGIYENA I SANITARIYA in Russian No 5, May 84 (manuscript received
21 Jul 83) pp 16-19

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[Abstract] Studies were conducted with 23-32 year old volunteers to determine the effects of special clothing on thermal homeostasis in relation to external temperature (22, 35 or 45°C) and humidity (10 mmHg or 20 mmHg). The clothing consisted of 100% cotton as well as various cotton/lavsan combinations, 100% viskoza @sic], and viskoza/polypropylene fabric, treated with a variety of water repellants (foboteks [sic], Scotchguard, or KE-30-04). Body heat loss was impaired by water-repellant clothing made wholly or partially of synthetic

fibers, and depended on permeability to air, water absorption and air circulation. Under conditions in which the ambient temperature exceeded the temperature at body surface (35-45°C), an increase in the air permeability of the clothing material to more than 15 dm³/m².sec led to deterioration of body thermal balance. However, at higher permeability values (50-100 dm³/m².sec) human thermal homeostasis improved and stabilized. At air temperatures below 35°C an increase in air permeability of the fabric improves temperature balance. A high degree of water absorption by the material in air temperatures of 22-45°C favors normal thermal homeostasis; however the significance of this factor in contributing to human wellbeing diminishes under conditions that diminish perspiration. Figure 1; references 3 (Russian).
[1546-12172]

UDC 616.98:578.832.1-085.37

USE OF VIRAL PROTEIN CONJUGATES WITH SYNTHETIC POLYMERS AS VACCINATING COMPLEXES FOR PROTECTION FROM INFLUENZA

Moscow IMMUNOLOGIYA in Russian No 4, Jul-Aug 84 (manuscript received 26 Dec 83) pp 50-52

PETROV, R. V., ZHDANOV, V. M., KABANOV, V. A., KHAITOV, R. M., KHARITONENKOV, I. G., NORIMOV, A. Sh., PODCHERNYAEVA, R. Ya., NEKRASOV, A. V., SINYAKOV, M. S. and SHCHIPANOVA, M. V., Institute of Immunology, USSR Ministry of Health; Institute of Virology, USSR Academy of Medical Sciences, Moscow

[Abstract] Isolated type A-HA surface antigens and a mixture (HA+NA) were covalently conjugated with a nontoxic synthetic polymer to produce conjugates or virogates which were tested as artificial vaccinating complexes for protection of mice from influenza. The influenza virus surface antigens were isolated from a high-yield recombinant strains MRC-11 and P-5 grown on 10 day embryos and purified and concentrated. Experiments were performed on mice which were immunized once intraperitoneally with solutions of the corresponding antigens and virogates at 1-16 ug viral protein per mouse. Seven or eight days after immunization the content of antibody-forming cells were determined in the spleens of the animals. One day fourteen after immunization the mice were infected with pathogenic influenza virus at a lethal dose of 10 LD₅₀. The results were statistically processed. The slightly immunogenic isolated surface antigens, when covalently bonded with a synthetic polymer carrier acting as an intracomplex biologically active adjuvant, are converted to highly immunogenic preparations inducing clear and specific immunity. A great increase in the protective potential of isolated surface antigens was observed when they were used as conjugates with synthetic polymers. Figures 3; references 16: 8 Russian, 8 Western. [1510-6508]

IMMUNOSTIMULATING ANTIINFECTION ACTIVITY OF SYNTHETIC ANALOGS OF BACTERIAL CELL WALL GLYCOPEPTIDES

Moscow IMMUNOLOGIYA in Russian No 4, Jul-Aug 84 (manuscript received 1 Jun 83) pp 53-55

NOSKOV, F. S., NIKITINA, L. Ye., MASLENNIKOVA, L. K. and FRIDMAN, E. A.,
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[Abstract] The Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, has developed a method for synthesis of bacterial cell wall glycopeptides containing mono-, di- and tetrasaccharide groups. This present article reports studies on the immunostimulating and antiinfectious properties of these compounds in experiments on laboratory animals. CBA mice were studied, the effectiveness criterion being increase in the number of antibody-forming cells to sheep erythrocytes in the spleen of the mice as determined by local gel hemolysis, or, the increase in antibody titer in the blood to a vaccine strain of influenza virus as recorded by the reaction of inhibition of hemagglutination. The studies of six synthetic glycopeptide analogs found three preparations to have immunostimulating effect upon primary administration of the antigen. The antiinfectious effect of the same preparations was also studied and three were found to have antiinfectious activity. References 9: 3 Russian, 6 Western.
[1510-6508]

UDC 616.98:579.841.11]-078.73

USE OF IMMUNOENZYME DIAGNOSIS OF DISEASE CAUSED BY BACILLUS PYOCYANEUS

Moscow IMMUNOLOGIYA in Russian No 4, Jul-Aug 84 (manuscript received 1 Nov 82) pp 85-87

BULAVA, G. V., GRIGOR'EV, N. I. and YERMOLIN, G. A., Scientific Research
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[Abstract] Test systems were developed for diagnosis of B. pyocyaneus complications in surgical patients based on two versions of the immune enzyme method and the possibility of their application for early diagnosis is estimated. The sera studied were obtained from 200 persons including 130 patients with various purulent-septic complications such as post-operative pneumonia, osteomyelitis, mediastinites, meningitis, abscesses of internal organs, peritonitis and sepsis, 20 patients without purulent complications and 50 healthy donors. Two versions of test systems were developed and it was found that B. pyocyaneus antigens can be detected in the blood of patients during the first three days of development of complications by tREMA. Both versions of the immunoenzyme method are effective serologic methods and be used for diagnosis of B. pyocyaneus complications. Figure 1; references 8: 3 Russian, 5 Western.
[1510-6508]

COMPARATIVE STUDY OF OPTICAL PROPERTIES OF BIOLOGICAL TISSUES EXPOSED TO HELIUM-NEON AND HELIUM-CADMIUM LASERS

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KUL'TURY in Russian No 4, Jul-Aug 84 (manuscript received 20 Jan 84) pp 50-52

[Article by I. B. Laprun, S. M. Zubkova and N. Z. Zagorskaya, Central Scientific Research Institute of Resort Therapy and Physiotherapy, Moscow]

[Text] In order to describe objectively the effect of laser radiation, it is necessary to test the optical properties of biological objects. The data on this score in the literature are quite contradictory [1, 3-7], which makes it difficult to use them to calculate absorbed doses of laser radiation and does not enable us to gain a clear idea about its penetrating capacity.

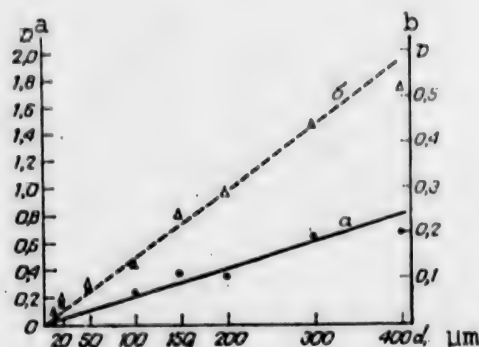
We have determined here light transmission of tissues and attenuation factor in the red region of the spectrum at $\lambda = 632.8$ nm (helium-neon laser) and blue region of the spectrum at $\lambda = 441.6$ nm (helium-cadmium laser), using a photosensor on the basis of a semiconductor "solar battery" element [2]. Because of the high sensitivity of such a photosensor, its small size and direct contact of photosensitive layer with tissue, adequate accuracy is obtained in measurement of intensity of laser radiation reaching the tested specimen and traversing it, without significant impairment of structural integrity of organs and tissues. Transmission of radiation by tissues of a living organism was determined on anesthetized (40 mg/kg nembutal) white rats, with preservation of blood supply and innervation. Estimation of radiation attenuation factor (K_λ) was made on histological sections 10 to 400 μ m in thickness, prepared with a microtome-cryostat. Use of tissues of anesthetized animals made it possible to preserve their in vivo filling with blood to a greater extent than with decapitation. K_λ was calculated as the tangent of the angle of inclination of the curve of optical density of the section as a function of its thickness (see Figure).

It was established that absorption capacity in the red part of the spectrum was maximal for the cerebral cortex and minimal for muscle tissue (see Table). The values of K_λ in the blue part of the spectrum were higher for all tested tissues and, particularly, the heart and lungs, than in the red part, which could be attributable to blood supply distinctions. As shown by the measurements we took, optical density of heparinized human venous blood is

Optical properties of rat tissues exposed to laser radiation

| Tissue | Attenuation factor (K_λ), cm^{-1} | | Transmission (T), % | | | |
|-----------------|---|-----------------------------|----------------------------|---|--|----|
| | helium- neon laser | helium- cadmium laser | tissue thickness, cm | helium-neon laser $T_{\text{exp}} (M \pm 1, \text{cm})$ T_{calc} | helium-cadmium laser $T_{\text{exp}} (M \pm 1, \text{cm})$ T_{calc} | |
| Skin | 10 | 27 | 0.09 | | | 9 |
| Muscle | 7 | 18 | 0.06 | | | 24 |
| Cerebral cortex | 15 | 20 | 0.10 | | | 13 |
| Heart | 7 | 41 | | | | |
| Lung | 11 | 49 | | | | |

7.2 times higher at $\lambda = 440 \text{ nm}$ than at $\lambda = 630 \text{ nm}$. This is apparently the cause of the mentioned differences in optical parameters of biological tissues.



Optical density D of histological preparations of rat cerebral cortex as a function of section thickness d with their exposure to helium-neon (a) and helium-cadmium (b) lasers

We calculated transmission of laser radiation by living organism tissues by means of attenuation factors K_λ (see Table) according to the law of Lambert-Beer:

$$T = 1/e^{K_\lambda d}$$

where d is thickness of tissue. As can be seen in the table, these values (T_{calc}), with the exception of transmission for muscle tissue at $\lambda = 441.6 \text{ nm}$, are close to experimental ones (T_{exp}). This established fact is indicative of the possibility of using the obtained values for attenuation factors in laser radiation dosimetry in order to calculate the depth of penetration of radiation and absorbed dose, not only experimentally, but in clinical practice (assuming that optical properties of animal and human tissues are identical).

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CSO: 1840/1002

EXPERIMENTAL USE OF CARBON DIOXIDE LASER FOR SURGICAL TREATMENT OF PYOINFLAMMATORY DISEASES OF SOFT TISSUES

Ashkhabad ZDRAVOOKHRANENIYE TURKMENISTANA in Russian No 3, Mar 84 pp 19-21

[Article by G. N. Penayeva, O. G. Babayev and B. R. Rakhmetov, Department of Surgical Diseases No 3 (Chief--Professor O. G. Babayev), Turkmen Order of Peoples' Friendship, State Medical Institute (Rector--Professor N. N. Nurmamedov)]

[Text] In recent years a number of authors have noted that the efficacy of antibiotic use is significantly reduced in the treatment of pyoinflammatory diseases of the soft tissues [1, 3].

Accordingly, combined methods of treating pyoinflammatory diseases of the soft tissues are acquiring a special importance. The literature contains reports on the high efficacy of laser therapy in treating suppurative wounds [2, 4].

The present report analyzes an experiment with combined treatment of 149 patients (86 men, 63 women) from 20 to 60 years of age with pyoinflammatory diseases of the soft tissues; in one third of the cases, carbon dioxide laser radiation was used together with traditional treatment methods. We used a surgical laser apparatus, the "Skal'pel'-1", with 30-watt output power. The focused radiation of the carbon dioxide laser enables us to make sterile, bloodless incisions, conduct "evaporation" of the pyoinflammatory tissues, and sterilize the suppurative wound surfaces.

Of 149 patients, 47 suffered with paronychias, 51 with furuncles, 12 with carbuncles, 22 with abscesses and 17 with soft tissue phlegmons. All patients came in with pronounced clinical symptoms at the height of sickness after conservative treatment methods proved to be ineffective.

Twenty six patients had subcutaneous paronychias of the ungual phalanx of the fingers, 16 patients had subcutaneous paronychias of the middle and basal phalanxes of the fingers and 5 patients had osteal panaritium of the ungual phalanxes.

In the case of subcutaneous paronychia of the ungual phalanx, following proper treatment of the area to be operated and anesthesia with a gamma-shaped incision using a focused carbon dioxide laser, the skin and fatty tissue were dissected. Then, the edges of the wound were spread open to check the subcutaneous fat and bone.

Immediately following this, the necrotic tissues were "evaporated" with a defocused laser beam. A rubber strip, wetted with an antiseptic solution, was placed into the wound and primary-delayed sutures were applied. In three days the drainage was removed and at the same time the sutures were tightened. We adhered to similar techniques in the case of subcutaneous paronychias of the middle and basal phalanx, with the only difference being that we made antero-lateral incisions according to Klapp. Of the 42 patients with subcutaneous paronychias (26 of the ungual phalanx and 16 of the middle and basal phalanx), first intention healing of wounds took place in 39 patients. The average period of treatment was 11-12 days in patients of this group.

In cases of osteal panaritium of the ungual phalanx of a finger, the incisions or fistulas made earlier were used for surgical intervention in some of the patients. Dissection of the soft tissues and necrectomy were performed with focused laser beams, sequesters were removed with a pointed bone scoop, and sterilization of the formed cavity was performed with a defocused laser beam.

The operation was concluded with the insertion of a rubber drainage strip and the application of primary-delayed sutures, which healed 3-4 days after the operation. Of the 5 patients with osteal panaritium, first intention healing was achieved in 4 patients. One of the patients required repeated treatment of the suppurative cavity.

In 51 patients with furuncles, the surgical treatment was undertaken under conditions of pronounced pyoliquefaction in the center of the inflammatory infiltrate. After proper preparation of the area to be operated and anesthesia, the core of the furuncle was removed with pincers, and the formed cavity was treated with a defocused laser beam. As a rule, in 5-6 days the wound, under a salve dressing, healed and a small scar was formed.

All the patients with carbuncles (12) displayed a pronounced necrotic process. In three cases, the carbuncle surface represented an ulceronecrotic focus from 3 to 6 cm in diameter. Surgical intervention was of two kinds depending on the localization of the abscess and its size. In 7 cases (when the process was located on the back or buttocks) dissection of the suppurative focus was performed with a focused carbon dioxide beam within the limits of healthy tissue and primary sutures were applied. The wound was drained for 3-2 days by a rubber tube for active aspiration of the contents. The sutures were removed on the eighth or ninth day, and in all cases first intention healing took place. In 5 patients dissection of the carbuncle was not feasible due to its size and anatomical location. In these cases we conducted a necrectomy with the use of a laser, which completely removed the pus and dead tissues. It should be stressed that a laser necrectomy is almost bloodless and enables sterilization of the wound. Then, the formed wound was treated with salve tampons according to general surgical procedures. A complete laser necrectomy prevents serious septic complications and markedly accelerates the reparative processes in the wound.

We adhered to the same surgical tactics in treating 22 patients with abscesses of the soft tissues. Among this group of patients, 18 patients had formed abscesses of subcutaneous fat measuring 4-7 cm, 3 patients had post-injection

abscesses in the buttock area following a magnesium sulfate injection. In sixteen cases dissection of the abscesses was performed with the application of primary sutures, and in six cases the abscess was opened and a laser necrectomy was performed. With the opening of abscesses and application of primary sutures, the average periods of treatment were 9.1 ± 1.3 days, and with a necrectomy and keeping the wound under a tampon-- 23.4 ± 2.3 days.

Patients with phlegmons comprised the most serious group among the studied patients. Fourteen patients had subcutaneous phlegmons and 3 patients had intermuscular phlegmons. The phlegmons were primary in six cases and secondary in eleven cases, resulting from nontreatment of the abscesses and carbuncles and their complications. Surgical intervention (opening of phlegmons) was undertaken only when conservative measures produced no effect. The phlegmons were opened with a focused laser beam. The wound was opened widely and the necrotic tissues were cut away, and then drainage was carried out by silicon tubes with numerous openings and primary-delayed sutures were applied. In the post-operative period the wounds were washed daily (every 3-4 hours) with antiseptic drop solutions (1% dioxin solution, 1:5000 furacin solution) and continuous aspiration of wounds was carried out. Washing of the wounds continued, on the average, for 5-6 days. The primary-delayed sutures were tied for 3 days and were removed in 8-9 days. According to our observations, the use of a laser in surgical interventions in the case of soft tissue phlegmons, the prolonged washing of wounds with antiseptic solutions after completion of surgical treatment of a suppurative focus, and the application of sutures combined with antibiotic therapy have insured first intention healing in 15 patients (88.3%).

CONCLUSIONS

1. Bloodless dissection of a suppurative focus, "evaporation" of necrotic tissues, and the sterilizing effect of laser radiation contribute to faster liquidation of the basic focus of suppurative infection and prevent the development of sepsis.
2. Laser use in pyosurgery together with modern methods of post-operative wound treatment and antibiotic therapy produces in most cases favorable conditions for the application of primary-delayed sutures, insures first intention healing, and reduces the treatment periods of patients.

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CSO: 1840/1501

LASER VISUALIZATION OF TISSUE

Moscow MOSCOW NEWS in English No 45, 18-25 Nov 84 p 10

[Article by Presnyakov, Alexander]

[Text] Soviet science has a new achievement to its credit--vision through opaque substances has been realized by means of...a laser beam. The man responsible for the discovery is Gurchen Askaryan, a senior research worker at the Institute of General Physics of the USSR Academy of Sciences.

In the course of ordinary experiments with a laser beam, Gurchen Askaryan discovered a new phenomenon: the translucence of opaque bodies.

When a beam emitted by a helium-neon laser is directed onto the palm of a hand, a round spot of the same color appears on the palm. By pressing the reverse side of the palm with, for example, a glass stick, a picture of the internal structure of the illuminated portion of the hand will appear on the light "miniscreen": threads of veins, bone joints, etc. All one has to do to examine the whole hand is to change the position of the "miniscreen" beam on the palm and press the reverse side of it.

The laser beam can cope with other substances as well as with living tissue.

It is early to foresee what the future holds in store for this phenomenal physical effect. But already today it is clear that it will find wide application in medicine, biology and veterinary. It is known that X-rays have a very limited use owing to their adverse effect on living tissues, whereas the laser beam is quite harmless. Moreover, due to its great penetrating power and biological activity it can be used as a remedy.

The laser beam resembles a catalyst-accelerator of biological processes. It stimulates a rapid exchange in cells which, under the action of light, accelerates fission. This speeds up the regeneration of necrotic areas of the tissue, resulting in an improvement in affected spots of the organism.

G. Askaryan had the following idea: to effect a local introduction of the laser beam into diseased areas of the organism. All that is necessary is to use an ordinary syringe with a capillary light conduit acting as a needle. Via this conduit the beam penetrates to the necessary area of the tissue and performs an improvement "operation" prescribed by the doctor.

UDC 616.127-005.5-089:615.849.19

EXPERIMENTAL LASER REVASCULARIZATION OF MYOCARDIUM

Moscow KHIRURGIYA in Russian No 10, Oct 84 (manuscript received 19 Sep 83)
pp 99-102

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physicomathematical sciences, ZDRADOVSKIY, S. R., candidate of medical sciences,
MARKIN, Ye. P., candidate of physicomathematical sciences, KOSHELEV, Ye. L.
and ELISEYENKO, V. I., POPOV, N. N. and CHIZHOV, G. K., candidate of medical
sciences, Moscow

[Abstract] Experimental studies were conducted on the feasibility of laser-induced left ventricular revascularization in outbred dogs, employing punctures made by carbon dioxide lasers up to 20 J in energy and applied for 80-100 msec. The microchannels formed initially were 200-300 μ m in diameter, surrounded by a zone of damage extending for 2-3 cardiomyocyte layers. The microchannels undergo endothelialization and narrow down to a diameter of 10-14 μ m within 6-8 months, but remain patent for at least 12 months. Such channels are surrounded by highly vascularized connective tissue. Blood entering the channels from the left ventricle is transported into the capillary and venous network of the myocardium, and thence into the venous sinus which opens into the right auricle. The laser-induced microchannels resemble the thebesian veins and were found effective in preventing myocardial ischemia and infarction in dogs with a ligated anterior descending branch of the left coronary artery. Figures 4; references 14: 7 Russian, 7 Western.
[1019-12172]

UDC 616.15-097.34-074:543.436

ASSAY OF CELLULAR AGGLUTINATION BY LASER NEPHELOMETRY

Moscow BYULLETen' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 3,
Mar 84 (manuscript received 6 Apr 83) pp 360-362

VYADRO, M. M. and OSIPOV, S. G., Scientific Research Institute of Biological Testing of Chemical Compounds, Moscow Oblast; Institute of Cardiology imeni A. L. Myasnikov, All-Union Cardiologic Scientific Center, USSR Academy of Medical Sciences, Moscow

[Abstract] A study was made of the possibility of using the method of laser nephelometry for quantitative assay of the agglutination of human tumor cells

under the influence of lectins. Cells of cultivated osteocarcinoma and pulmonary adenocarcinoma were used. The tumor cells were incubated with EDTA for 5 minutes at 37°C, then twice washed with saline solution and subsequently centrifuged, counted and brought to the necessary concentration. Microscopic studies revealed that the suspension of cells produced consisted of individual cells with no agglutinates. The tumor cells suspended in saline solution were incubated in siliconized test tubes at room temperature with various concentrations of phytohemagglutinin or concanavaline, then suspended in a Pasteur pipette and transferred to a cuvette. Microscopic examination revealed that, after 30 minutes of incubation, cell agglutination reaches a maximum and subsequently does not increase. The data indicate the possibility of using laser nephelometry for quantitative evaluation of cellular agglutination. The parameters recommended are: cell concentration $5 \cdot 10^5 - 3 \cdot 10^6$ per ml, determination of V/Δ of light scattering in the first five minutes of the study and constant lectin concentration. Figures 2; references 10 (Western). [879-6508]

CYTOLOGIC PATTERN IN LEISHMANIASIS LESIONS SUBJECTED TO COMBINATION THERAPY INVOLVING LASER IRRADIATION

Ashkhabad ZDRAVOOKHRANENIYE TURKMENISTANA in Russian No 1, Jan 84 pp 3-6

BABAYEV, O. G., KARIMOV, A. M., BABAYEV, Kh. B., NEKRASOVA, Ye. P. and BABAYEVA, O. B., Chairs of Pathologic Anatomy and Surgical Diseases No 3, Turkmen Order of People's Friendship State Medical Institute

[Abstract] Histologic examinations were conducted on cutaneous lesions due to leishmaniasis in 11 patients, 18-30 years old, of 2-4 month duration following combined antibiotic + CO₂ laser treatment. Laser irradiation (laser"scalpel) promoted rapid healing of otherwise refractory ulcers: pain abated within 1 day, granulation commenced by the 5th postradiation day, and epithelialization was completed in 17 days. Only one patient presented with a recurrence which was successfully managed by further laser therapy. Histologic evaluation of smears obtained from the lesions showed that by day 5 there was a significant reduction in the number of contaminating cocci, neutrophils, erythrocytes and macrophages, while the number of fibroblasts increased. These observations underline the utility of laser management of suppurative wounds due to cutaneous leishmaniasis. Figure 1; references 7 (Russian). [1502-12172]

BRIEFS

LASER MONITORS OIL POLLUTION--An ultraviolet beam falls on a film of oil, spilled on a water surface, and immediately data on the degree of pollution of the sea surface appears on the instrument screen. This is the way that laser sounding of pollutants in an aqueous medium takes place with a fluorimeter--an instrument, produced in the Yerevan Special Design-Engineering Office of Aerosol Instruments and Detectors of the USSR State Commission of Hydrometeorology. This multipurpose instrument is sensitive to pollutants at a distance up to 200 meters, and for this reason may be used from the side of a plane or helicopter. The action principle is: the reflected laser beam is divided into sixteen colors of the visible range that carry information on the levels of petroleum products and organic substances in the water. The fluorimeter may also be used in agriculture and geology. [Text] [Minsk SOVETSKAYA BELORUSSIYA in Russian 5 Sep 84 p 1] 12525

CSO: 1840/001

ROLE OF OBLAST CLINICAL HOSPITAL IN IMPROVING QUALITY OF MEDICAL CARE

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 9, Sep 84 (manuscript received 10 Jan 84) pp 36-39

YADYKINA, L. I., MINAKOV, V. F., ROZOVA, I. N. and KRASNOVA, M. N., Voronezh Oblast Clinical Hospital; All-Union Scientific Research Institute of Social Hygiene and Public Health Care Organization imeni N. A. Semashko, Moscow

[Abstract] The role of the Voronezh district clinical hospital in improving Soviet medical and health care is described and discussed. The hospital has 2000 beds, 38 hospital departments and 20 auxiliary departments, consultation polyclinics, women's consultation facilities and boarding facilities for 150 outpatients. More than 300 modern methods of diagnosis, including coronarography, echo EKG, film angiography and video recording have been introduced in recent years. Scientific and practical specialized centers have been developed. Rheumatism morbidity has been lowered and the number of relapses has been reduced 1.5-fold. The hospital has one of the best anesthesiology and reanimation centers in the RSFSR. The center includes departments of anesthesiology, reanimatology, hyperbaric oxygenation, toxicology and hemodialysis. In the last 15 years, 17,020 patients, including 7853 planned treatments, were treated in the department of reanimation with stable improvement occurring in 84 percent of the cases. The hospital was one of the first in the RSFSR to have a department of medical genetics. Improvements in operation of the hospital include: operation in accordance with procedures of the scientific organization of labor, organization of automatic control systems, centralization of services and establishment of an office of public nutrition. The physical plant of the hospital is described and the work of the hospital administrative, party and trade union organizations discussed. Awards and honors received by the hospital and its personnel are listed. [1553-2791]

TOXOPLASMOSIS: PRINCIPLES OF DIAGNOSIS AND TREATMENT

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 5, Sep-Oct 84 (manuscript received 6 Mar 84) pp 49-53

MOROZ, B. V., NIKIFOROV, V. N., TRYAKINA, I. P. and NOYEVA, N. A., All-Union Toxoplasmosis Center, USSR Ministry of Health; [expansion unknown], Moscow

[Abstract] Over the period from 1976 to 1983, 2167 patients at the All-Union Toxoplasmosis Center in Moscow underwent clinical and laboratory studies for toxoplasmosis, on the basis of gynecologic and obstetrical indications, CNS disorders, visual pathology, diseases of internal organs, lymphadenopathy, and prolonged sub-febrile periods of unknown etiology. Toxoplasmosis was diagnosed in 212 of these patients (9.8%). Of that number, 196 (92.5%) [sic] presented with a chronic form of the disease, and 16 (7.5%) with acute and subacute forms. Therapy was highly individualized, but included in all cases antimicrobial agents, antihistaminics, sedatives, vitamins and symptomatologic management. In cases with immunodeficiency levamisole was prescribed. Evaluation of the outcomes showed that best clinical results were obtained with etiotropic therapy supplemented with levamisole whenever indicated. References 18: 17 Russian, 1 Western. [1600-12172]

UDC 616.36-002.14-022:578.891]-022.14:[616.995.121.55+616.995.132.8]-092-053.2

EFFECTS OF HYMENOLEPIASIS AND ENTEROBIASIS ON INFECTIOUS HEPATITIS IN CHILDREN

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 5, Sep-Oct 84 (manuscript received 30 Jun 83) pp 31-35

MAGDIYEVA, S. R., ASLETDINOV, N. Yu. and ZIGANSHINA, N. Kh., Scientific Research Institute of Medical Parasitology imeni L. M. Isayev, Uzbek SSR Ministry of Health, Samarkand

[Abstract] An assessment was made of the clinical course of infectious hepatitis in 400 pediatric patients in relation to superinfection or concomitant infestations with parasitic pathogens. In the cohort, 7.75% of the patients were also diagnosed for hymenolepiasis, 27% for enterobiasis, 23.25% for lambliasis, and 9.75% represented mixed infestations of lambliasis + enterobiasis. A moderately severe course predominated in patients with hymenolepiasis, with features of general intoxication (weakness, apathy, headaches, vertigo, anorexia, etc.) being more pronounced and especially prominent during the preicteric phase. Laboratory studies revealed a tendency toward erythrocytopenia, accelerated ESR, the appearance of juvenile neutrophils and basophils; these findings were particularly prominent in the patients with hymenolepiasis. These observations indicate that hymenolepiasis exacerbates the course of infectious hepatitis in children. References 10 (Russian). [1600-12172]

TEXTILE SUPPLIES FOR MEDICAL APPLICATION

Moscow TEKSTIL'NAYA PROMYSHLENNOST' in Russian No 9, Sep 84 pp 72-73

YANSHPUN, R. L. and CHISTYAKOV, M. M., engineers, VNIITGP [expansion unknown], Moscow

[Abstract] From March, 1983 to April, 1984 an exhibit has held at VDNKh [Exhibition of Achievements of the National Economy) in Moscow in the "Health USSR" pavillion on the use of textiles in medicine. The 27 displays concentrated on various forms of support and compression hosiery, dressings, gloves, elastic bandages, drainage catheters, etc., manufactured in the USSR. The items on display were protected by Authors' Certificates and represented the latest advances in technology, with listing of suppliers.
[039-12172]

ALCOHOL-INDUCED DEPRESSION

Moscow ZDOROV'YE in Russian No 10, Oct 84 p 19

BABENKOV, G. I., candidate of medical sciences

[Abstract] Symptoms and consequences of alcohol-induced depression are discussed and brief excerpts from two case histories of persons suffering from alcohol-induced depression are presented. Dangers from moderate habitual drinking are pointed out. The importance and effectiveness of prompt medical treatment of alcohol induced depression are emphasized.
[1558-2791]

UDC 613+614.2:378.661

CURRENT TASKS IN TRAINING PHYSICIANS, TEACHING SOCIAL HYGIENE AND PUBLIC HEALTH CARE ORGANIZATION

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 9, Sep 84 (manuscript received 10 May 84) pp 9-14

YERMAKOV, V. V. and MINDLIN, Ya. S., professors, 1st Moscow Medical Institute imeni I. M. Sechenov

[Abstract] Improvement of medical training, with special emphasis on preventive medicine, is described and discussed. Training programs must place special emphasis on the role of social hygiene and public health care organization in order to prepare physicians for competent performance at the present stage of medical care. Training programs must integrate medical

training with actual experience in clinical departments and other medical departments, since preventive medicine requires that physicians have the ability to deal with problems of social hygiene and public health in addition to skill in their own specialty.
[1553-2791]

UDC 617-001.17-02:615.276.4]-07

EFFECTS OF THYMIC PREPARATION TIMALIN [SIC] ON HEALING OF BURNS AND IMMUNE RESPONSIVENESS

Moscow KHIRURGIYA in Russian No 10, Oct 84 (manuscript received 3 Nov 82)
pp 115-118

KOLKER, I. I., professor, MINKOVA, G. L., POBEDINA, V. G., PANOVA, Yu. M., SERGEL', O. S., VISHNEVSKAYA, S. M., IVANOV, D. B., MOROZOV, V. G. and KHAVINSON, V. Kh., Microbiology and Immunology Laboratory, Department of Thermal Burns, and Laboratory of Clinical Diagnosis, Institute of Surgery imeni A. V. Vishnevskiy, Moscow

[Abstract] Clinical trials were conducted on burn patients (52) to test the effectiveness of timalin [sic], a polypeptide factor isolated from the thymus [Morozov, VG, and Khavinson, VKh, Eksper. Khirurg., No 2: 49-51, 1974], in enhancing healing and potentiating T-cell immunity. Timalin was administered i.m. in doses of 10-20 mg b.i.d for 5-10 days to the patients with burns covering 10-50% of body surface, in conjunction with other standard therapy employed in burn units. The results showed that timalin was definitely effective in 84% of the patients in improving their clinical state and in enhancing wound healing in comparison with patients managed in the same manner sans timalin. In certain cases the effects of timalin were not immediate, but delayed for 7-14 days (particularly as concerns epithelialization). In addition, patients treated with timalin showed a statistically significant elevation in T-cells in comparison with healthy controls, a parameter that is often depressed in that category of patients. References 13: 7 Russian, 6 Western.
[1019-12172]

SUCCESSIVE REPLACEMENT OF LETHAL BLOOD LOSS IN DOGS WITH POLYGLUCIN AND PERFLUOROCARBON EMULSION

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 97, No 8, Aug 84 (manuscript received 2 Jul 83) pp 160-162

AKHSYANOV, U. U. and AFONIN, N. I., Laboratory of Biologically Active Emulsions and Lyophilization of Biological Preparations (headed by Candidate of Medical Sciences M. I. Afonin), Central Scientific Research Institute of Hematology and Blood Transfusion, Moscow

[Abstract] Perfluorocarbon emulsions are used as the gas transporting basis of blood substitutes. Polyglucin, an antishock plasma substitute widely used in therapy, was used by the authors as a plasma expander for a domestic perfluorodecaline-perfluorotripropylamine emulsion. Experiments were performed on 6 mongrel dogs of both sexes following blood loss of 50 ml per kg of body mass. After blood pressure fell to 0-5 mmHg, polyglucin was administered, 85% oxygen was switched on, then after 10 minutes the polyfluorocarbon emulsion was administered. Infusion of polyglucin and emulsion after blood loss resulted in restoration and stabilization of Pa and f. Blood volume was slightly greater than before the experiment, dropping to 80% of initial circulating volume within 2 hours. Calculations showed that infusion of the emulsion supported about 75% of total $\dot{V}O_2$ and 34% of $\dot{V}O_2$, as a result of the elevated venous pO_2 . All animals survived the experiment. Figure 1; references 8: 3 Russian, 5 Western.
[1512-6508]

UDC 615.919:579.843.1.083.338

COAGGLUTINATION ANALYSIS OF CHOLERA ENTEROTOXIN

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 10, Oct 84
(manuscript received 8 Dec 82) pp 69-73

BELAYA, Yu. A., GAYLONSKAYA, I. N., BYSTROVA, S. M. and FERAPONTOV, G. K.,
Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy
of Medical Sciences, Moscow

[Abstract] Trials were conducted on the application of the coagglutination test to the analysis of cholera toxin in culture fluids, using the techniques described by Belaya [Belaya, Yu. A., and Belaya, O. F., Lab. Delo, No 8: 34-40, 1982]. The coagglutination test was found suitable for the detection of the toxin with a sensitivity of 1-10 ng/ml, and the positive/negative results were in full agreement with the results obtained by a variety of biological tests and other standard serologic procedures. The simplicity of the coagglutination test and the lack of requirements for special equipment and expensive reagents, as well as the speed with which results can be obtained, show that this test can be recommended for the rapid detection of cholera toxin. References 23: 7 Russian, 16 Western.
[1587-12172]

UDC 631.466

DEVELOPMENTAL CHARACTERISTICS OF MICROSCOPIC FUNGI ON NONSPECIFIC MEDIA

Moscow BIOLOGICHESKIYE NAUKI in Russian No 8, Aug 84 (manuscript received 11 Apr 83) pp 76-78

KANEVSKAYA, I. G. and LEBEDEVA, Ye. V., Institute of Botany, USSR Academy of Sciences

[Abstract] Fungi isolated from various industrial materials and objects in Armenia and the Crimea were studied for colony features since growth on unnatural substrates is known to alter such characteristics. The fungal isolates obtained from such objects were identified as *Alternaria alternata*, *A. humicola*, *Aspergillus niger*, *A. versicolor*, *A. ustus*, *Stemphylium macrosporoideum*, *Trichoderma lignorum*, *Chaetomium globosum* and *Cladosporium*

herbarum, as well as *Penicillium lanosum*, *P. lanoso-viride*, and *P. notatum*. In general, the *Penicillium* and *Trichoderma* species were the isolates most frequently recovered from materials maintained under storage conditions, while *Alternaria*, *Cladosporium* and *Stemphylium* predominated among the isolates obtained under open-field conditions. The descriptions of changes in colony morphology and color may be used in the identification of microfungi isolated under analogous conditions. References 9: 4 Russian, 5 Western.
[1531-12172]

UDC 614.718-078

COMPARATIVE CHARACTERISTICS OF METHODS FOR DETERMINING BACTERIAL CONTAMINATION OF AIR

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 84 (manuscript received 23 Nov 83) pp 47-49

SOKOLINSKIY, L. M. and MAKSIMOV, V. F., Kuban Medical Institute, Krasnodar

[Abstract] Qualitative and quantitative characterization of biological contamination of air may be achieved only through adequate analysis of bacterial and viral components of aerosols. An apparatus was developed for microbiological analysis of air. In field tests, this new apparatus was more effective in trapping bacteria than the commonly used Krotov unit; the new apparatus trapped 3.5 times as many microorganisms. The Krotov apparatus showed a 35% "escape" of bacteria, the new unit only 2%. No detailed description of this equipment is given. References 3 (Russian).
[1549-7813]

MILITARY MEDICINE

UDC 613.68-07:613.2:577.164.2+616.391-008.64:577.164.2]-057:656.61]-084.2

PREVENTION OF VITAMIN C DEFFICIENCY AMONG SEAMEN

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 84 (manuscript received 24 Oct 83) pp 85-87

NOVIKOV, V. S., MASTRYUKOV, A. A. and PETROV, V. P.

[Abstract] The goal of this work was to determine the real and physiologically essential bodily content of vitamin C in ship personnel during long lasting cruises. The observations were made on 40 individuals, 19-20 years old, half of whom received 100 mg of ascorbic acid as vitamin supplement daily. Analysis of the data showed that during long-term cruises at various latitudes, a significant drop in vitamin C occurred leading to poor work performance and increased sickness. It was concluded that seamen should take a 200 mg dose of ascorbic acid daily while on extended sea trips. References 10: 8 Russian, 2 Western.
[1549-7813]

INFLUENCE OF MICROWAVES ON WORKING CAPACITY AND IMPEDANCE IN RAT BRAIN STRUCTURES

Leningrad FIZIOLOGICHESKIY ZHURNAL IMENI I. M. SECHENOVA in Russian Vol 70, No 4, Apr 84 (manuscript received 14 Apr 81) pp 419-500

VASILEVSKIY, N. N., GONDAREVA, L. N. and KOYSIN, B. A., Department of Ecologic Physiology (headed by N. N. Vasilevskiy), Institute of Experimental Medicine, USSR Academy of Medical Sciences, Leningrad; Central Scientific Research Laboratory (headed by M. M. Sarsembayev), State Medical Institute, Karaganda; Department of Information and Computer Technology (headed by V. N. Arakelov), State Polytechnical Institute, Karaganda

[Abstract] A study is presented of the working capacity as well as impedance of components of the sensomotor cortex and hypothalamic nuclei of the rat brain in the process of chronic irradiation by low level microwaves. Changes in components of the impedance of the brain, muscles and liver under exposure to microwaves were compared. Studies were performed on white rats of both sexes irradiated by microwaves at $\lambda = 12.6$ cm, four to six hours per day for 30 days. The chronic effects of nonthermal microwaves generally increased the maximum working capacity of the animals after five days, then working capacity remained high for most of the period of irradiation, decreasing toward the end to its initial values. Changes in the impedance of the brain, muscles and liver in vitro were maximal in the hypothalamic area of the brain at day five, remaining high throughout the period of irradiation. However, Rb decreased and remained lower than the initial values and Rh did not change. In the area of the muscles and liver, Rh increased and remained high throughout the period of irradiation. Rb for liver specimens increased on the tenth and thirtieth days of irradiation. Ch decreased on the tenth day, Cb also showed a tendency to decrease toward the middle of irradiation. In vivo changes in Ch and Cb of the hypothalamic nuclei were thus greater than in vitro. References 19: 18 Russian, 1 Western.

[800/6508]

STUDY OF FREQUENCY CHARACTERISTICS OF CENTRAL NEURONS OF ELECTRORECEPTOR SYSTEM OF SKATE IN RESPONSE TO ELECTRICAL AND MAGNETIC FIELDS

Kiev NEYROFIZIOLOGIYA in Russian Vol 17, No 4, Jul-Aug 84 (manuscript received 12 May 83) pp 464-470

ANDRIANOV, Yu. N., BROUN, G. R., IL'INSKIY, O. B. and MURAVEYKO, V. M., Institute of Physiology imeni I. P. Pavlov, USSR Academy of Sciences, Leningrad; All-Union Cardiologic Center, USSR Academy of Medical Sciences, Moscow

[Abstract] Experiments were performed on skates (*Raja radiata*) adapted to laboratory life. The fish were fixed in an experimental aquarium and sea water passed through the gills. The pulse activity of individual neurons of the lateral segments of the medula oblongata was recorded with glass microelectrodes while the electroreceptor system was stimulated with individual sine-wave electrical and magnetic fields. Ninety percent of the neurons had background activity at frequencies of 0 to 10/s. A homogeneous electric field evoked tonic responses, the nature of which was determined by the polarity of the rectangular stimulus, leading to the appearance of on and off responses. The latent periods were 30 to 50 ms for moderate stimulus intensity. Fields of 0.1-1 $\mu\text{V}/\text{cm}$ evoked responses in more than 80% of neurons. The optimal frequency range for magnetic signals was shifted into the higher frequency area in comparison to electrical signals, 2-3/s. The minimum magnitude of magnetic induction evoking reactions from the neurons was 50 μT . Behavioral experiments will be required to determine the biological significance of these phenomenon. Figures 6; references 19: 3 Russian, 16 Western.
[812-6508]

ADVERSE EFFECTS OF NONUNIFORM CONSTANT MAGNETIC FIELDS ON RAT EMBRYOS

Ashkhabad ZDRAVOOKHRANENIYE TURKMENISTANT in Russian No 3, Mar 84 pp 33-34

BASHMACHNIKOV, K. V. and ZATEPYAKIN, Yu. S., Scientific Research Institute of Obstetrics and Gynecology, USSR Academy of Medical Sciences

[Abstract] Pregnant and nonpregnant outbred female rats were exposed to nonuniform constant magnetic fields from sources with maximum surface induction of 35 ± 2 mT, to test the effects on embryos and reproductive capacity. Such magnetic fields were found to exert no effect on pre-implantation mortality, nor to affect reproductive activity. However, death of implanted embryos occurred if irradiation took place during days 6-14 of pregnancy. These effects were presumably due to interference with developmental processes and placentation. References 6: 4 Russian, 2 Western.
[1504-12172]

EFFECTS OF LOW FREQUENCY (50 Hz) ELECTRIC FIELDS ON ANIMALS IN RELATION TO ONTOGENIC STAGE

Moscow GIGIYENA I SANITARIYA in Russian No 3, Mar 84 (manuscript received 24 Oct 83) pp 44-48

KOZYARIN, I. P., SHVAYKO, I. I. and VOYTSEKHOVSKIY, V. M., Kiev Medical Institute imeni A. A. Bogomolets

[Abstract] Outbred rats in different stages of ontogenic development (embryos, sexually-immature, adults, aged) were examined for the effects of exposure to low frequency (50 Hz) electric fields (10 or 20 kV/m) for 2 h/day for up to 4 months. Analysis of the developmental, physiological, and biochemical indicators demonstrated that the sexually-immature rats were most susceptible in terms of functional and metabolic changes in the nervous system. These observations indicate that in assessing the putative hazards that electrical fields may represent for humans, age factors should be given careful consideration. An obvious conclusion, based on such preliminary animal studies, is that school-age children should not be exposed to high-voltage lines. References 10 (Russian).
[1505 172]

UDC 547.963.3:612.014.44

STUDY OF SYNTHESIS OF DAUGHTER DNA IN UV-RESISTANT AND UV-SENSITIVE CHINESE HAMSTER CELL CLONES UPON UV RADIATION

Leningrad TSITOLOGIYA in Russian Vol 26, No 3, Mar 84 (manuscript received 17 May 83) pp 343-348

BARENFEL'D, L. S., Institute of Cytology, USSR Academy of Sciences, Leningrad

[Abstract] A study was made of two values: the distance between pyrimidine dimers in DNA strands and the mean dimensions of daughter DNA fragments synthesized after UV irradiation of UV-sensitive and UV-resistant Chinese hamster cell clones. The cells were grown in quartz flasks on eagle's medium containing 10% bovine serum. ^{14}C -Thymidine was introduced in the logarithmic growth phase for 2 days, then the medium was replaced with a nonlabeled medium and the cells were exposed to UV light at $\lambda=254\text{ nm}$ at 4 J/m^2 (0.165 J/m^2 per second). After that a ^3H thymidine label was introduced for 60 minutes. It was shown that in the UV-sensitive clone CHS1, the dimensions of DNA fragments synthesized after UV radiation are equal to the difference between pyrimidine dimers in the daughter DNA. This agrees with the supposition of formation of gaps opposite pyrimidine dimers. In the UV-resistant clone V-79 the dimensions of the fragments of newly synthesized DNA are greater than the distance between pyrimidine dimers, the gaps probably having been filled by denova synthesis. Figure 1; references 29: 6 Russian, 23 Western.
[872-6508]

ELECTROMAGNETIC FIELDS ON RAILROAD TRANSPORT LINES

Moscow ELEKTRICHESKAYA I TEPLOVOZNAYA TYAGA in Russian No 9, Sep 84 pp 36-37

GOL'DMAN, E. I., All-Union Scientific Research Institute of Railroad Transportation, Moscow

[Abstract] With the growth of the electric railroad network, considerable attention is being given to the effect of electromagnetic fields on the bodies of the workers employed on such lines. In general, humans are always exposed to the effect of natural magnetic fields and adapt to them. A 5 kV/m dose of the electric field can be safely tolerated and does not interfere with performance of daily duties. The dose on the electric railroads does not exceed this level. A more complicated situation exists in the enclosures around the locomotives where local exposures may be higher. In any case, none of the common complaints of the railroad workers could be related to exposure to electromagnetic fields generated by the electric lines. Static electricity however may accumulate on various points in the equipment being moved; this problem, however, could be easily solved by proper grounding, antistatic sprays etc. In any case, the most common complaint connected with this is a slight electric shock.

[043-7813]

MAGNETIC FIELD THERAPY

Minsk SOVETSKAYA BELORUSSIYA in Russian 6 Oct 84 p 4

LYAPICH, S.

[Abstract] An interview with physician A. M. Demetskiy is reported concerning his efforts in applying magnetic field as an adjunct to surgical therapy. Historical references to real and bogus magnetic therapies were made. Even presently, many quacks exist, the so called "extrasensory healers", who trade on magnetic fluids and taking advantage of human suffering. Nevertheless, when magnetic fields are used properly, under scientific direction, considerable improvements may be observed: shortening of the recuperative and healing time, successful treatments of lip cancer, therapy of spinal fractures, etc. The blood circulation and the nervous systems are especially sensitive to magnetic fields. The inflammatory problems are resolved rapidly in magnetic field probably because of the bipolar nature of the cells of the vascular system. In the future, magnetic fields may be used to concentrate specific drugs in a given organ site.

[046-7813]

UDC 616-056.43-022.913-092:616.155.36-097

HUMAN BASOPHIL TESTING OF VENOM COMPONENTS ISOLATED IN POLYTETRAFLUOROETHYLENE

Moscow IMMUNOLOGIYA in Russian No 4, Jul-Aug 84 (manuscript received 1 Jul 83) pp 58-63

GUSHCHIN, I. S., CHITAYEVA, V. G., MIROSHNIKOV, A. I., SNEZHKOVA, L. G., LAZAKOVICH, Ye. M. and POROSHINA, Yu. A., Institute of Immunology, USSR Ministry of Health, Institute of Bioorganic Chemistry imeni M. M. Shemyakin, Moscow

[Abstract] Individual forms of toxic reaction to bee stings include so-called false allergic reactions resulting from bee venom components which cause primary liberation of allergy mediators from target cells, not involving the immune mechanism. Bee venom contains large numbers of components, requiring that those which are particularly allergenic or cause false allergic reactions be determined. This was done by studying the effect of the major protein and peptide components of bee venom on human basophils both from normal patients and those with elevated bee sting sensitivity. A comparatively simple method was used to separate the individual components apamine, MCD-peptide, tertiapine, secapine, PLA₂ (phospholipase A₂) and melittin. The method was based on hydrophobic reverse phase chromatography of bee venom on polytetrafluoroethylene in water plus ethanol. Melittin was found to be the primary active component for basophils of persons insensitive to bee venom, melittin and PLA₂, for those sensitive to bee stings. Liberation of histamine from the basophils of persons sensitive to bee stings was caused by PLA₂ in all cases, indicating it to be the major allergenic component of bee venom. Basophils were found to vary simultaneously in sensitivity to this component and the major peptide allergen melittin. Figures 4; references 22: 9 Russian, 13 Western.
[1510-6508]

CONTRIBUTION OF NMR SPECTROSCOPY TO STUDY OF STRUCTURAL-FUNCTIONAL RELATIONSHIPS OF PROTEIN-PEPTIDE SUBSTANCES

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 10, No 8, Aug 84
(manuscript received 24 Apr 84) pp 997-1043

BYSTROV, V. F., Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow

[Abstract] This is a review article on the use of high resolution nuclear magnetic resonance spectroscopy has had a decisive influence on the study of the conformation of peptides and proteins in solution. Standard NMR methods have been modified developing new approaches so that this powerful method can be used for the study of structural and functional relationships in protein-peptide substances. This review discusses spin-spin interaction in peptides, the use of spin-spin interactions for conformational analysis of valinomycin, the relationship of signals in NMR spectra of protein-peptide substances, NMR study of the spatial structure of muretoxins and of the three dimensional structure of the double spirals of gramicidin A. The use of NMR spectroscopy for the study of protein-peptide substances has allowed analysis of the full three dimensional structure of the molecules in solution. This work has been decisively advanced by the development of special methods of interpreting spectra and establishment of the relationships between spectral parameters and the conformation of protein-peptide substances, as well as the development of the physical theory and improvement of NMR spectroscopic hardware, particularly the creation of magnets with high field intensity and the usage of electronic computers. Figures 33; references 154: 34 Russian, 120 Western.
[1511-6508]

UDC (574.64:582.232)+599

TOXICITY OF BLUE-GREEN ALGAE FOR CERTAIN INSECT LARVAE

Kiev GIDROBIOLOGICHESKIY ZHURNAL in Russian Vol 20, No 4, Jul-Aug 84
(manuscript received 15 Sep 81) pp 69-72

SEMAKOV, V. V. and SIRENKO, L. A., All-Union Scientific Research Institute of Agricultural Microbiology, Leningrad; Institute of Hydrobiology, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] A variety of blue-green algae were tested for toxicity for the housefly (*Musca domestica*) larvae and gypsy moth (*Ocneria dispar*) caterpillars, in order to evaluate the algae as potential sources of useful biological control substances. Larval mortality ranged from 20-100% with all of the algae tested (*Anabaena autumnalis*, *Merismopedia* sp., *Nostoc muscorum*, *Nostoc* sp., *Anabaena variabilis*, *Microcystis aeruginosa*) when mixed with feed, with

the exception of *Synechocystis* sp. which was nontoxic. A mortality figure of 100% was obtained with the caterpillars 3-7 days after feeding with the algae was commenced, without any exceptions. These observations indicate that the blue-green algae may be regarded as a promising source of novel toxins that may be useful in the biological control of harmful insects. Figures 1; references 20: 11 Russian, 9 Western.
[1514-12172]

UDC 614.71:615.285.7]-07

SUBSTANTIATION OF MAXIMUM PERMISSIBLE AIR CONCENTRATIONS OF BITOXIBACILLIN

Moscow GIGIYENA I SANITARIYA in Russian No 4, Apr 84 (manuscript received 13 Sep 83) pp 70-72

BEKZHANOVA, Ye. Ye., Uzbek Scientific Research Institute of Sanitation, Hygiene and Occupational Diseases, Tashkent

[Abstract] Extensive use of bitoxibacillin in agriculture in Uzbekistan has led to studies on threshold limit values on guinea pigs and albino rats. Exposure of the animals to bitoxibacillin aerosols varying in concentration from 6×10^7 to 9×10^9 cells/m³ has shown that the agent elicits both toxic and sensitizing sequelae on a dose- and time-related basis. It has also become evident that the sensitizing concentration exceeds the toxic concentration. The nonsensitizing concentration (4.5×10^4 cells/m³) has been recommended as the mean daily maximum permissible concentration for humans, equivalent to 0.0015 mg/m³ on a weight basis, based on a four month extrapolation. References 10 (Russian).
[1506-12172]

UDC 615.285.7:547.241].099.076.9:613.165/.166

FUNCTIONAL EFFECTS OF CARBOPHOS INHALATION IN COMBINATION WITH HIGH TEMPERATURE AND ULTRAVIOLET RADIATION

Moscow GIGIYENA I SANITARIYA In Russian No 4, Apr 84 (manuscript received 30 Jun 83) pp 11-14

MIKHAYLOV, V. V., Crimean Medical Institute, Simferopol

[Abstract] Various physiological parameters were monitored in rabbits exposed simultaneously to inhalation of carbophos (5 mg/m³) for 4 h at 30°C and UV irradiation (654 μW/cm² optimum dose, and doses 2X and 4X the optimum dose), under conditions of 100% humidity. The combination of carbophos, high humidity, high temperature and UV irradiation induced various qualitative and quantitative physiological alterations which indicated potentiation of carbophos toxicity on an overall basis. The tabulated data on blood chemistries, cardiovascular,

respiratory and nervous functions demonstrated that one parameter studied in isolation does not constitute a reliable criterion of toxicity, particularly when a combination of physical and chemical factors is involved. Best assessment of toxicity comes from the evaluation of as many physiological variables as possible. References 6 (Russian).
[1506-12172]

TOXICOLOGY OF HEPTAPHOS PESTICIDE AND DETERMINATION OF SAFE EXPOSURE LEVELS

Moscow GIGIYENA I SANITARIYA in Russian No 4, Apr 84 (manuscript received 17 Jun 83) pp 18-22

KAGAN, Yu. S., PAN'SHINA, T. N., VOYTENKO, G. A., SASINOVICH, L. M., RODIONOV, G. A., VORONINA, V. M., KOKSHAREVA, N. V., SHULYAK, V. G., DESHI, I., KARMOSH-VARSEGI, M. and SHTROMAYER, A., All-Union Scientific Research Institute of Toxicology of Pesticides, Polymers and Plastics, Kiev; State Hygiene Institute, Hungarian Ministry of Health, Budapest

[Abstract] Albino rats, mice and guinea pigs were employed in a study on acute, subacute and chronic toxicity of the systemic insecticide heptaphos (0,0-dimethyl-0-(6-chlorobicyclo(3.2.0)-heptadien -1,5-yl)phosphate). Exposure of the animals via respiratory, intragastric or cutaneous routes showed that heptaphos is a highly toxic agent (LD_{50} = 75 mg/kg for mice, 135 mg/kg for rats) which acts by activation of the M and N cholinergic systems, involving marked inhibition of cholinesterase activity. The toxicity of heptaphos was greater when exposure involved the respiratory rather than the intragastric route, and the maximum permissible concentration for man has been calculated at 0.5 mg/m³. References 3 (Russian).
[1506-12172]

UDC 613.863-07:[616.43/.45+616.411]-091-02:615.31:[547.95:547.95:547.943].092.9

STUDY OF ANTISTRESSOR EFFECT OF D-ALA²-LEU⁵-ARG⁶-ENKEPHALIN

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 97, No 8, Aug 84 (manuscript received 22 Jun 83) pp 199-200

LISHMANOV, Yu. B., AMOSOVA, Ye. N., SLEPUSHKIN, V. D. and YAREMENKO, K. V., Laboratory of Pathophysiology (headed by Doctor of Medical Sciences V. D. Slepushkin), Siberian Department, USSR Academy of Medical Sciences and Laboratory of Experimental Chemotherapy of Tumors (headed by Doctor of Medical Sciences K. V. Yaremenko), Siberian Department, USSR Academy of Medical Sciences, Tomsk

[Abstract] Opioid neuropeptides may act as endogenous stress modulators. A study was performed to determine the influence of enkephalins on the non-specific morphologic changes in the organism and level of glucocorticoids in

stress. Experiments were performed on 50 white male rats and 20 white rats. Stress was produced by 18 hour suspension by the scruff of the neck. Experimental animals received synthetic arginine-containing hexapeptide leu-enkephalin analog in various doses or an eleutherococcus extract preparation, a very effective adaptogen. The experiments showed that 18-hour suspension of rats causes characteristic changes in mass of internal organs and formation of ulcers in the gastric mucosa. Immunoreactive cortisol level increased by a factor of 5.7. Statistically-insignificant changes in these factors were achieved by administration of the enkephalin analog. There was also no increase in level of immunoreactive cortisol in the blood of stressed rats receiving the peptide. The minimum effective dose was $1 \mu\text{g}/100 \text{ g}$. Neither the enkephalin nor eleutherococcus extract prevented gastric ulcers. The results indicate that enkephalin can have an antistress effect. References 7: 5 Russian, 2 Western.
[1512-6508]

UDC 612.173.1.015.31:546.33].014.46:615.214.24:547.854.5

SODIUM PERMEABILITY OF CARDIAC CELLS UPON EXPOSURE TO NEMBUTAL

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 97, No 8, Aug 84 (manuscript received 10 Jun 83) pp 201-203

DMITRIYEVA, N. V., SHTRASGEYM, Ye.I., BURNASHEV, N. A. and CHERNOKHVOSTOV, V. V., Scientific Research Institute for Biological Testing of Chemical Compounds, Moscow

[Abstract] A study was made of the influence of nembutal at concentrations near those causing general anesthesia on the action potential and its first derivative of frog heart ventricles, the sodium current in frog atrial trabeculae and sodium current of rat heart cells. The contractile response, action potential and its first derivative were measured on frog heart tissue strips perfused with Ringers solution. Nembutal $5 \cdot 10^{-6}$ – $5 \cdot 10^{-4} \text{ M}$ suppressed contractile response and increased duration of action potential in the repolarization phase. The results of measurement of amplitude on action potential and its first derivative were ambiguous. Aero and negative results obtained upon exposure to nembutal at several concentrations apparently result from basic limitations in adequate recording of the potential in multi-cell objects. The authors performed a series of experiments studying the effect of nembutal on the sodium current in a single cell. For all concentrations studied, the volt-ampere characteristics virtually coincided with the control. Nembutal at the concentrations studied therefore does not interact with the activated sodium channels. The mechanism of suppression of the contractile activity of the myocardium in nembutal anesthesia therefore does not involve sodium permeability. Figures 3; references 13: 5 Russian, 8 Western.
[1512-6508]

EXPERIMENTAL TRIALS ON CHEMOPROPHYLAXIS OF OPISTHORCHIASIS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 5, Sep-Oct 84 (manuscript received 28 Nov 83) pp 38-40

LYSENKO, A. Ya., TsOLIUV (Central Order of Lenin Institute for the Advanced Training of Physicians), Moscow

[Abstract] Experimental clinical trials were conducted with hamsters to determine the effectiveness of praziquantel in the prevention of opisthorchiasis. The animals were injected with metacercaria one to three times and treated with praziquantel before or after infection at ca. 7 day intervals with 100 mg/kg of the drug for a total of 6 treatments. Autopsies on the hamsters 3-5.5 months after infection showed that praziquantel prevented the maturation of the metacercaria into adult forms and, in addition, the feces were free of *Opisthorchis felinus* eggs. These observations indicate that praziquantel should be investigated further as a potential agent for the prevention of opisthorchiasis in endemic areas. Figure 1; references 4 (Russian). [1600-12172]

UDC 615.23

GANGLIOBLOCKING EFFECT AND CURARE-LIKE EFFECT OF SOME SULFONIUM COMPOUNDS OF HYDROQUINONE DERIVATIVES

Dushanbe DOKLADY AKADEMII NAUK TADZHIKSKOY SSR in Russian Vol 27, No 4, Apr 84 (manuscript received 3 Feb 84) pp 214-216

VEZEN, A. Ye., KHAYDAROV, K. Kh. and NUMANOV, I. U., corresponding member TaSSR Academy of Sciences, Institute of Chemistry imeni V. I. Nikitin, TaSSR Academy of Sciences

[Abstract] Sulfonium salts (5) of hydroquinone derivatives produced at the USSR Academy of Sciences Institute of Petrochemical Synthesis were analyzed pharmacologically. Names and structures of the preparations are presented in a table. The effect of intravenous injection of 0.1-1 percent aqueous solutions of the compounds into cats weighing 3-5 kg was studied. Ganglio-blocking effect and curare-like effect was judged by the capacity of the substance to reduce the amplitude of contraction of the tongue and third eyelid in response to stimulation by an electric current (0.5-2 V, frequency 1-20 Hz) of the trunk of the sublingual nerve and the preganglial fibers of the cervical sympathetic trunk. The sulfonium salts with 5-membered and 6-membered cyclic sulfides stimulated the synaptic structure and, after introduction of bicyclic sulfides, the compounds blocked the ganglionic and neuromuscular synapses. All compounds studied were quite active. It was recommended that bisulfonic analogs with a distance between-S-atoms equal to 6-7 Å (for ganglioblockers) or 14 Å (for curare-like preparations) be produced on the basis of the monosulfonic preparations studied. References 4 (Russian). [1548-2791]

NECESSITY OF CONSIDERING RELATIONSHIP BETWEEN ORAL AND INHALATIONAL TOXICITY OF SUBSTANCES IN ESTABLISHMENT OF HYGIENIC STANDARDS

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 84 (manuscript received 18 Oct 83) pp 13-16

VOYTENKO, G. A., KAGAN, Yu. S., TOMKIN, V. M., FEDORENKO, V. I. and SHTABSKIY, B. M., All-Union Scientific Research Institute of Hygiene and Toxicology of Pesticides, Polymers and Plastics, Kiev; Lvov Medical Institute

[Abstract] Comparative toxicity of various agents entering the human through respiratory organs or gastro-intestinal tract has not been given adequate attention; a potentially-dangerous situation exists in underestimating toxic effects of substances entering the human body by both routes simultaneously. In an attempt to solve this problem, a concept of "oral-inhalational" coefficient (analogous to dermal-oral or oral-venous coefficients) was introduced and practical aspects of its application to control of hazardous substances was discussed. It appeared that determination of toxic and maximum permissible levels for individual hazardous substances must include the combined effect of a given agent on the body regardless of the route of entry. References 11 (Russian). [1549-7813]

UDC 615.285.7.099.015.4:616.831-008.94:[577.175.522+577.175.823]-074

EFFECTS OF CHOLINESTERASE-INHIBITING PESTICIDES ON BIOGENIC AMINE LEVELS IN RAT BRAIN

Moscow GIGIYENA I SANITARIYA in Russian No 5, May 84 (manuscript received 9 Nov 83) pp 80-81

KUZ'MINSKAYA, U. A., IVANITSKIY, V. A. and SHILINA, V. F., All-Union Scientific Research Institute of Hygiene and Toxicology of Pesticides, Polymers and Plastics, Kiev

[Abstract] Albino rats were employed in a study on the effects of poisoning with khlorofos (0,0-dimethyl-(2,2,2-trichloro-1-oxy-ethyl)-phosphonate), khostakvik (0,0,0-dimethylphosphoryl-6-chlorobicyclo-(3,2,0-hepta-1,5-diene)), or sevin (1-naphthyl- α -methyl carbamate). The pesticides were administered per os for 10 days in doses equivalent to 1/10th of LD₅₀. Administration of khostakvik resulted in depression of cholinesterase activity and decreased serotonin levels in the brain, while dopamine levels increased. After 15 days all of the parameters returned to baseline levels. Khlorofos administration led to immediate elevation in brain norepinephrine levels, with concomitant depression of serotonin concentration and diminution of cholinesterase activity. After 5 days DOPA levels decreased, while serotonin levels showed further depression. After 15 days cholinesterase activity returned to baseline levels, but dopamine showed depression and epinephrine elevation. Sevin

also induced immediate changes in enzymatic activity and imbalance in the biogenic amines of the brain, with the changes rectified by day 15. These observations indicate that monitoring dopamine and serotonin levels in the brain can be an additional sensitive test for toxicity of the cholinesterase-inhibiting pesticides. References 5 (Russian).
[1546-12172]

UDC 614.3/.4:615.9

FUNCTION OF TOXICOLOGY DEPARTMENTS OF SANITARY-EPIDEMIOLOGIC STATIONS

Moscow GIGIYENA I SANITARIYA in Russian No 9, May 84 (manuscript received 2 Jun 83) pp 73-74

RUSAKOV, N. V., SAVEL'YEVA, Yu. I. and KOROTKOVA, G. I., Main Sanitary-Epidemiologic Administration, USSR Ministry of Health; Institute of Medical Parasitology and Tropical Medicine, USSR Ministry of Health, Moscow

[Abstract] Toxicology departments have been established at all republic-level, kray and oblast sanitary-epidemiologic stations, to evaluate new chemical preparations, synthetic materials and objects fabricated from them for human and environmental safety. Because the ground rules under which the departments were first established were not clearly formulated, many of such departments at the present time engage in fundamental research and, to all intents and purposes, function more like branches of scientific research institutes rather than fulfilling the purpose for which they were established. The time has come to correct the imbalance and to utilize the resources and expertise of such departments in controlling toxicity. To insure a proper balance between fundamental and applied research will require multipartite cooperation between all the involved ministries and departments, as well as research institutes, to delineate the proper spheres of responsibility.
[1546-12172]

UDC 615.285.7.015.4:[612.822.1:612.397.7

EFFECT OF CHLOROPHOS ON LIPID COMPOSITION OF BRAIN AND SPINAL CHORD OF WHITE RATS

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 84 (manuscript received 29 Nov 83) pp 71-72

KUZ'MINSKAYA, U. A. and YAKUSHKO, V. Ye., All-Union Scientific Research Institute of Hygiene and Toxicology of Pesticides, Polymers and Plastics, Kiev

[Abstract] Chlorophos [0,0-dimethyl(2,2,2-trichloro-1-hydroxyethyl)phosphonate¹ (I)] is a widely used pesticide. Its effect on the content of lipids in CNS was studied on rats exposed to 78 mg/kg does of I for 10 days. The results

of these experiments showed that stable changes occurred in the content of gangliosides, cerebrosides and cholesterol--the main components of neuronal and myelal membranes. The changes observed in the lipid composition of CNS represent evidently the biochemical basis of the neurotoxic action of I.

References 4: 2 Russian, 2 Western.

[1549-7813]

UDC 614.7+613.632]:615.285.7]-07:616-008.931:577.152.143]-074

UTILIZATION OF BIOCHEMICAL INVESTIGATIONS OF MONOAMINEOXIDASE ACTIVITY IN
HYGIENIC EVALUATION OF ENVIRONMENTAL TOXIC FACTORS ACTIVITY

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 84 (manuscript received
31 Jan 84) pp 49-52

ZEYNALOV, T. A., Scientific Research Institute of Virology, Microbiology and
Hygiene imeni G. M. Musabekov, AzSSR Ministry of Health, Baku

[Abstract] Adverse effect of various environmental factors on the human body at early stages of intoxication is accompanied by changes in the permeability of biomembrane (labilization). Under conditions of biomembrane labilization the behavior of key enzymes is very important because they represent key links in the mechanism of metabolic processes. One of such enzyme systems is monoamineoxidase (MAO)--flavine oxidative enzyme involved in metabolism of neuromediators and biogenic amines participating in regulation of neuroendocrinologic and cardiovascular systems. An effect of environmental factors on the MAO activity was established (noise, radiation, pesticides, drugs, etc.). Experiments were performed on white Wistar rats trying to find whether activation of MAO does occur after exposure to cyneb and bygone. It was established that oral administration of cyneb had not effect on the activity of MAO. In liver, cyneb slowed down the in vivo activity of A type MAO but not the B type; no effect was found in vitro. In experiments with bygone, both in vivo and in vitro, an increase in oxidative desamination of 2-FEA in brain and liver was noted. The observed deviations from normal CNS functions were due to changes in acetylcholine levels as well as such neurotransmitters as biogenic amines whose catabolism is controlled by MAO.

References 8: 6 Russian, 2 Western (both by Russian authors).

[1549-7813]

BRIEFS

NEW ANTIBIOTIC--A preparation with a wide set of properties has been developed jointly by associates at the Institute of Organic Chemistry, Siberian Department, USSR Academy of Sciences, Novosibirsk, Institute of Organic Synthesis, Latvian SSR Academy of Sciences and Novosibirsk University. The preparation has the appearance of bright-yellow crystals. Upon the addition of alcohol the crystals form a solution that looks like a lemon liqueur. This "liqueur" is designed for use primarily against microbes such as staphylococci, diphtheria bacteria and many other causative agents of diseases. The substance acts like an antibiotic, is used to treat dysentery, typhoid and suppresses bacteria resistant to penicillin. In addition, the new preparation is highly effective against dermatophyte microfungi, and significantly exceeds the effectiveness of foreign analogous preparations. In that connection, it is not only useful to humans, but also to certain domestic animals. It will be useful too, in the processing of plants--from potatoes to grapes. In a word, the new preparation is a fungicide also. Noteworthy is the fact that the preparation acts as both an antibiotic and growth stimulant for agricultural animals. This property has been tested on young pigs. Telephone for further information: Novosibirsk, 65-26-46. [Text] [Moscow TEKHNKA I NAUKA in Russian No 8 Aug 84 p 11] [COPYRIGHT: "Tekhnika i nauka," 1984] 6289

CSO: 1840/1507

UDC 618.831-005.1-036.11-092:612.014.426

CORRELATIONS BETWEEN ACUTE IMPAIRMENTS OF CEREBRAL BLOOD CIRCULATION AND
CHANGES OF EARTH'S MAGNETIC FIELD

Moscow ZHURNAL NEVROPATOLOGII I PSIKHIATRII imeni S. S. Korsakova in Russian
Vol 84, No 8, Aug 84 (manuscript received 26 Oct 82) pp 1137-1140

ZAV'YALOV, A. V. and DYACHENKO, V. K., Chair of Nervous Diseases (head of
department, Professor B. I. Laskov), Chair of Normal Physiology (head of
department, Professor A. V. Zav'yalov), Kursk Medical Institute

[Abstract] Analyses of 4023 cases of acute disturbances of cerebral circulation during 1968-1978, by histories of the disease and autopsy reports of neurological departments of hospitals of cities of the Central Russian plateau (Bryansk, Orel, Kursk, Belgorod and Zheleznogorsk) was performed to explain regularities of correlation of acute disturbances of cerebral circulation with intensity and with intermediate variability of the earth's magnetic field. There was a highly reliable correlation between frequency of cases of acute disturbances of cerebral circulation and changes of the earth's magnetic field. An equation of non-linear correlation between them was derived. The use of the regression correlation method was found to be the best method for analyzing correlations between the rise of vascular catastrophes and changes of the earth's magnetic field. A more reliable biotropic parameter than earth's magnetic field intensity was found to be its gradient. The presence of a linear correlation between changes of the earth's magnetic field and frequency of cases of acute disturbances of cerebral circulation was shown for the first time. The possibility of quantitative assessment of the biological significance of the earth's magnetic field was demonstrated. These regularities must be considered during medical prediction of weather to prevent cardiovascular diseases. Figures 2; references 16 (Russian).
[1554-2791]

HYPERBARIC OXYGENATION IN PREVENTION OF DISTURBANCES OF CEREBRAL BLOOD CIRCULATION IN ACUTE STAGE OF STROKE

Moscow ZHURNAL NEVROPATOLOGII I PSIKHIATRII imeni S. S. Korsakova in Russian Vol 84, No 8, Aug 84 (manuscript received 16 Sep 83) pp 1147-1151

PRAVDENKOVA, S. V., ROMASENKO, M. V. and SHELKOVSKIY, V. N., Department of Hyperbaric Oxygenation (director, Professor Yu. V. Isakov) and Department of Emergency Neurosurgery (director, Professor V. V. Lebedev), Scientific Research Institute of First Aid imeni N. V. Skifosovskiy (director, B. D. Komorov, corresponding member USSR Academy of Medical Sciences), Moscow

[Abstract] The effect of the use of hyperbaric oxygenation in preventing repeated disturbances of cerebral blood circulation and in treating ischemic stroke in the acute phase was studied. Hyperbaric oxygenation was included in complex therapy of 124 patients in the acute stage of the stroke (basic group) while 108 patients in the acute period of the stroke did not receive hyperbaric oxygenation (control group). Both groups had identical clinical indicators including: the basic disease which caused infarction, area of vascular lesion, gravity of condition and neurological status, time of hospitalization (days after disturbance), age and sex. Use of hyperbaric oxygenation in complex therapy of ischemic stroke in the acute period helped to prevent repeated circulatory disturbances up to the 3rd week after the injury. One of the mechanisms involved is, evidently, normalization of the central hemodynamics and pulmonary respiration parameters. References 14: 7 Russian, 7 Western.
[1554-2791]

UDC 616.831.44-008.65-02:615.837.3

REVERSIBLE FUNCTIONAL BLOCKAGE OF VISUAL TRACT UNDER THE INFLUENCE OF FOCUSED ULTRASOUND

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 6, Jun 84 (manuscript received 1 Jul 83) pp 760-762

ABRIANOV, O. S., BYKHODTSEVA, N. I., FOKIN, V. F., URANOVA, N. A., AVIROM, V. M. and GALOGAZHA, M., Scientific Research Institute of the Brain, All-Union Scientific Center for Mental Health, USSR Academy of Medical Sciences, Moscow

[Abstract] A study was made of the possibility of using nondestructive focused ultrasound to create changes leading to temporary reversible blockage of transmission of information through the visual tract. The indicator of functional changes was the evoked potential of visual system nerve centers. Electron microscope studies of determinations of visual tract fibers was used to check the functional nature of the focused ultrasound. Experiments

were performed on 40 mature cats under nembutal narcosis. Irradiation was performed through a trepanation aperture in the skull with undamaged dura matter. Ultrasound in the form of a pulse train was imparted to the brain by means of a sealed sonic contactor filled with saline solution. When the focused ultrasound was transmitted to the visual tract, changes occurred in the amplitude and time parameters of evoked potentials. The nature and duration of these changes were determined by parameters of the radiation dose and varied broadly with them. The suppression of bioelectric activity could be complete, partial or alternating, meaning that the mean values of amplitude and other evoked potential parameters were retained but the dispersion of the values was significantly greater than normal. The effects were fully, partially, or not reversible. Figures 2; references 5: 2 Russian, 3 Western. [882-6508]

UDC 612.41.014.2+0.14.481:576.851.252

EFFECTS OF STAPHYLOCOCCUS AUREUS ON FORMATION OF SPLENIC HEMOPOIETIC COLONIES AND RECOVERY OF ERYTHROPOIESIS IN MICE AFTER IRRADIATION

Moscow BIOLOGICHESKIYE NAUKI in Russian No 8, Aug 84 (manuscript received 31 Jan 83) pp 44-47

KHOROBYKH, V. V., SANIN, A. V. and KHOLODNAYA, L. S., Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya

[Abstract] Exogenous and endogenous formation of splenic hematopoietic colonies was followed in BalB/c, (CBA x C57Bl/g) F_1 , and CBA mice in relation to intravenous administration of Staphylococcus aureus Cowan-1 and Wood-46 cells, prior to 5.5-8.3 Gy irradiation. Injection of 10^8 cells enhanced colony formation, with S. aureus Cowan-1 showing maximum effectiveness when administered 3 days before irradiation, and Wood-46 if injected 1 day prior to irradiation. Both strains were equally effective in promoting recovery of erythropoiesis as measured by Fe-59 uptake which, after 10 days, was twice as great in the experimental animals as in the control mice. Pre-treatment of bone marrow cells with the bacterial cells for 30 min at 37°C and subsequent injection of the marrow cells into lethally-irradiated recipients led to a 1.5- to 2-fold increase in the number of exogenous colonies. Since similar findings were observed with a number of other microbial cells and antigens, the effects of S. aureus on erythropoiesis in mice appears to be nonspecific. Figures 2; references 19: 8 Russian, 11 Western. [1531-12172]

COMPREHENSIVE APPROACH TO STUDIES IN ECOLOGICAL PHYSIOLOGY (DEDICATED TO D. A. BIRYUKOV'S 80th BIRTHDAY)

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOV in Russian Vol 70, No 9, Sep 84 (manuscript received 29 Feb 84) pp 1241-1247

VASILEVSKIY, N. N., Scientific Research Institute of Experimental Medicine, USSR Academy of Medical Sciences, Leningrad

[Abstract] Developments in ecological physiology in the fifties and sixties, were greatly stimulated by the studies of D. A. Biryukov who generalized evolutionary, ecological, clinico-physiological and biological studies and developed a program of research which is being followed to this day. More recently, emphasis has been placed on the adaptive aspects of ecological physiology and the importance of physiological individuality, as well as on the importance of biological rhythmicity in various neural and other functions. Among the latest active areas of research are adaptation disorders and chronobiology, which benefitted considerably from the multidisciplinary trend and tone set by D. A. Biryukov. References 41: 40 Russian, 1 Western. [070-12172]

UDC 612.82

CORRELATION BETWEEN CORTICAL AND AUTONOMIC PROCESSES IN REGULATION OF HUMAN BRAIN FUNCTION

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOV in Russian Vol 70, No 9, Sep 84 (manuscript received 29 Jan 84) pp 1265-1271

KLIMOVA-CHERKASOVA, V. I., KUZEMKIN, V. A., MIKHAYLOVA, I. M. and SIZAYA, N. A., Physiology Laboratory, Scientific Research Institute of Disability Evaluation Expertise and Organization of Invalid Employment, Leningrad

[Abstract] Correlative studies were conducted on the interrelationship between cortical and autonomic processes in healthy subjects (18-33 years) and patients with cerebrovascular disease (42-56 years), to determine the significance of such interrelationship to brain function in both categories of subjects. The subjects were challenged with auditory and visual stimuli and required to perform motor responses, in conjunction with monitoring of EMG, evoked potentials, heart rate and EEG. A number of differences were noted between the clinically-healthy subjects and those with disturbed cerebral hemo-dynamics, including diminished nonspecific facilitation of visual evoked potential in 40% of the patients. Other changes and differences included a positive correlation between the heart rate and EMG amplitude in relation to neurodynamic performance in the healthy subjects, and the lack of such a correlation in the patients. Taken in toto, these observations indicate that the pattern of interaction responsible for regulating brain function is compromised in cerebrovascular disease, and that the operational status of the brain in the patients is defective. Figures 3; references 12 (Russian). [070-12172]

HYPOTHALAMO-HYPOPHYSAL-ADRENAL AXIS IN IMMUNOREGULATION

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOV in Russian
Vol 72, No 9, Sep 84 (manuscript received 20 Apr 84) pp 1286-1293

KORNEVA, Ye. A. and SHEKHINTK, E. E., Immunophysiology Laboratory, Department of General Pathology and Pathologic Physiology, Scientific Research Institute of Experimental Medicine, USSR Academy of Medical Sciences, Leningrad

[Abstract] Wistar rats were employed in studies designed to further define neuroendocrine regulation of the cellular and humoral immune response, and the role of neuroendocrine factors in modulating some physiological effects of antibodies. Glucocorticoids were identified as key neuroendocrine modulators of immune responsiveness in a variety of experimental conditions, with the endocrine effects related to the intensity of the antigenic challenge. Glucocorticoids affect various immune cellular systems, and the net effect depends on the susceptibility of a particular cell system to these hormones. Similarly, glucocorticoid status altered the effects of antigens on splenocytic cyclic nucleotide levels: the early increase in cAMP was abolished in adrenalectomized animals, but the late rise in cAMP levels remained unaffected. On an overall basis, as end representatives of the hypothalamo-hypophyseal-adrenal axis, glucocorticoids have a definite, but complex, role in the modulation of the immune response. Figures 5; references 31: 21 Russian, 10 Western.
[070-12172]

BRAIN STRUCTURE

Moscow MOSKOVSKAYA PRAVDA in Russian 4 Oct 84 p 3

IORDANSKIY, A., APN

[Abstract] Human brain, the most complex system known, consists of billions of nerve cells--the neurons which can join into systems of varying complexity interacting with each other. Initial studies in this field began early in the 20th century when it was shown that the principal cells of brain cortex consist of pyramidal, star-like and spindle cells. Contacts between individual nerve cells are achieved by means of many dendrites--the incoming signal receivers, and one axon by which the signal is sent out to other cells. Each neuron can make contact with thousands of cells in near proximity or at distant locations. Axon fibers may split into many branches, some of which serve as enhancing contacts, some as filters of the not so important messages. One of the most difficult tasks for the investigators is the determination of the pathways of these nerve cell branches. The classical method of studying brain morphology was based on rather random staining with silver salts. Recently, selective stains were developed for different brain systems. However, these agents can only be used in living brain, hence they are limited

to animal experiments. Even this difficulty was resolved now, when a new method was developed, based on a combination of cobalt salt staining and an electric field mobility. This method can be applied not only to living cells, but also to fixed preparations.
[047-7813]

UDC 591.51+612.821

INDIVIDUAL VARIATIONS IN BEHAVIOR, LEARNING AND ADAPTATION TO EXTREME FACTORS IN RATS

Leningrad FIZIOLOGICHESKIY ZHURNAL S.S.R. IMENI I. M. SECHENOV in Russian
Vol 70, No 9, Sep 84 (manuscript received 29 Feb 84) pp 1294-1300

ALEKSANDROVA, Zh. G., SUVOROV, N. E., SHANIN, Yu. N. and TSYGAN, V. N.,
Department of Ecologic Physiology, Scientific Research Institute of Experimental Medicine, USSR Academy of Medical Sciences; Chair of Pathophysiology, Military Medical Academy imeni S. M. Kirov, Leningrad

[Abstract] Outbred rats were studied for a correlation between their entropy level, learning potential, and adaptation to hypoxic hypoxia (in terms of survival time at 12,000 m). On the basis of general motor activity (movement, posturing, sniffing, grooming, etc.) the animals were divided into low-entropy rats (I), intermediate-entropy rats (II), and high-entropy animals (III). Instrumental food-conditioned reflex was acquired most rapidly in category III animals. In addition, animals in categories II and III also showed the longest survival times under hypoxic hypoxia, and represented 67% of all the animals (30) studied. There is, therefore, a direct correlation between adaptability to extreme factors, learning potential, and entropy level in the rats under study and, consequently, between the "strength" of the nervous system and entropy. Figures 4; references 14: 12 Russian, 2 Western.
[070-12172]

BRAIN AS COMPLEX SYSTEM

Leningrad LENINGRADSKAYA PRAVDA in Russian 29 Sep 84 p 2

IOORDANSKIY, A., APN [News service]

[Abstract] Neurons, the components of brain, are very complicated structures, much more so than any other cells of the human body. The first attempts to study brain go back to 1906 when Santiago Ramon y Cajal identified three types of cells in the brain cortex: pyramidal, stellate and spindle cells. The contacts between nerve cells are made by the so-called dendrites by means of which the cell received various signals. Each neuron has also an axon--by means of which signals are passed to other cells. Each neuron may contact thousands of others. The contacts between neurons vary in their properties resulting in immediate acceptance of a given message or in a

"filtering" effect of the unimportant ones. One of the important fields of study concerns the network of these neurons and dendrites. Classical morphological approaches to this problem were limited in that the dyes used were nonspecific and did not permit investigation of specific brain fields. New agents were developed which were able to identify a specific neuron network but they worked only on living brain and therefore were limited to animal experiments. In recent years, P. Belichenko developed a new staining method based on cobalt salts which can be applied to living cells as well as to fixed preparations.
[041-7813]

UDC 616-001.18:616.379.008.64(001.6)

SENSITIVITY OF ANIMALS TO DIABETOGENIC EFFECT OF ALLOXAN IN COLD ADAPTATION

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 97, No 8, Aug 84 (manuscript received 13 Jan 84) pp 240-242

SHORIN, Yu. P., SELYATITSKAYA, V. G., NEPOMNYASHCHIKH, G. I., PAL'CHIKOVA, N. A. and KHODOVA, R. R., Instit-te of Clinical and Experimental Medicine, Siberian Department, USSR Academy of Medical Sciences, Novosibirsk

[Abstract] A study is presented of the sensitivity of control and cold-adapted animals to alloxan. Experiments were performed on 130 male wistar rats in January-April. Some of the animals were placed in a low temperature chamber at 4°C, the control animals were maintained at 22°C. After 50 days some of the animals from both groups received alloxan hydrate intraperitoneally at 17 mg per kg body weight in pH 4.0 acetate buffer 18 hours after their last feeding. The percent which died was monitored over the next 5 days. The animals were decapitated after 14 to 20 days and the concentration of glucose in the blood determined, as well as the level of immunoreactive insulin (IRI) in the plasma. The IRI level was reliably decreased by cold adaptation. In 5 days after administration of alloxan, 58% of the control animals died, among the survivors there was persistent hyperglycemia with a significant drop in IRI. In the cold adapted animals, 28% died in the 5 days, normoglycemia and unaltered IRI levels were observed. The major role in prevention of diabetes by cold adaptation is the increase in reactivity of the body's antioxidant protective system. References 14: 8 Russian, 6 Western.
[1512-6508]

STATE OF ANTITOXIC SYSTEM OF RAT SMALL INTESTINE AND LIVER UPON EXPOSURE TO CHOLERA ENTEROTOXIN

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 97, No 8, Aug 84 (manuscript received 18 Jan 83) pp 190-192

YURKIV, V. A. and POPKOVA, N. I., Laboratory of Molecular Bases of Pathogenesis of Infectious Diseases (headed by Candidate of Biological Sciences V. A. Yurkiv) Central Scientific Research Institute of Epidemiology, USSR Ministry of Health

[Abstract] The purpose of this work was to study the primary enzymes of nonspecific defense of the organism from the toxic effect of oxygen--super-oxide dismutase and glutathione peroxidase (SOD and GP) in the cytosols of the intestinal mucosa and liver upon exposure to cholera toxin. Experiments were performed on male rats. Intestines were ligatured at a separation of 18 to 20 cm and cholera toxin administered. The animals were decapitated after 30 minutes, 1, 2 and 4 hours. The liver was perfused, the ligatured and two nearby segments of small intestines washed with tris-HCl buffer pH 8.0 containing 0.3 mM phenylmethylsulfonylfluoride. The cytosol fraction was taken from the intestinal mucosa and the activity of glutathione-SH-transferase, SOD and GP determined. The change in activity of the enzymes on exposure to cholera toxin was common, involving both the mucosa of all segments of the intestine and the liver. The decrease in SOD activity indicated an increase in content of superoxide anion radicals leading to activation of phospholipase. One result of this is an increase in liberation of arachidonic acid and prostaglandin synthesis, resulting in development of inflammatory-like damage, disruption of cell permeability and possible loss of enzymes in a vicious cycle. The decrease in GP activity facilitates accumulation of peroxide oxidation products, including fatty acid hydroperoxide, resulting in liberation of more PG. References 15: 2 Russian, 13 Western.
[1512-6508]

UDC 616.45-001/3+616-003.93

APPEARANCE OF SIGNS OF STRESS IN MICE UNDER INFLUENCE OF LYMPHOID CELLS FROM SYNGENEIC HYPOKINETIC ANIMALS

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 97, No 8, Aug 84 (manuscript received 3 Oct 83) pp 146-148

LI, S. Ye., YUDINA, N. V., TURCHENKO, G. V., SULEYMANOVA, N. S. and BABAYEV, A. G., Department of Physiology and Pharmacology (headed by Professor I. I. Brekhman), Institute of Marine Biology, Far Eastern Scientific Center, USSR Academy of Sciences, Vladivostok; Laboratory of Growth and Development (headed by Doctor of Medical Sciences A. G. Babayeva), Institute of Human Morphology, USSR Academy of Medical Sciences, Moscow

[Abstract] A study was made to determine whether lymphoid cells transmit the basic indications of stress and elevated preparation for subsequent regeneration

processes. Experiments were performed on 300 male mice, stress being caused by placing the mice for 17 hours in cages which greatly limited their motor activity. Spleenocytes were transplanted intravenously to syngeneic recipients at $5 \cdot 10^7$ cells per mouse. The recipients were intact mice as well as animals on which the central portion of the liver had been resected under ether narcosis (about 30% of the liver). The recipients and donors were sacrificed 2, 3, and 7 days after spleenocyte transfer, organs were sectioned, paraffin sections of the liver were stained with n and e and the mitotic index of the hepatocytes was determined. Limitation of motor activity for 17 hours caused a decrease in body mass as well as mass of the thymus, spleen and liver. The spleenocytes differed significantly from the splenocytes of normal animals. The spleenocytes of these animals could cause certain signs of stress among syngeneic recipients, including adrenal hypertrophy, atrophy of the thymus and a decrease in mitotic index. In recipient animals, partial hepatectomy caused greater reduction and growth rate than surgery alone, with other changes similar to those observed in the intact animals which received spleenocytes. Lymphoid cells of hypokineticized animals depressed proliferation of hepatocytes in nonoperated recipients, indicating that the mechanism of transfer by lymphocytes of regeneration information is depressed by changes in the properties not only as a result of stress. References 13: 9 Russian, 4 Western.

[1512-6508]

UDC 612.01 (07-86) 011.012

INFLUENCE OF HYPEROXIA ON CURVE OF DISSOCIATION OF OXYHEMOGLOBIN AT DIFFERENT AGES

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY (In Russian) Vol. 97, No 8, Aug 84 (manuscript received 12 Jan 83) pp 146-158

IVANOV, L. A. and CHEBOTAREV, N. D., Department of Clinical Pathology and Pathology of Internal Organs (headed by Professor O. V. Korashko), Institute of Gerontology, USSR Academy of Medical Sciences, Kiev

[Abstract] The wide use of oxygen therapy in geriatric practice and the reported side effects and occasional ineffectiveness of the therapy require a study of the influence of oxygen on the aging organism. This work studies the oxygen transport function of the blood in older persons inhaling oxygen. Nine healthy persons 60 to 74 years of age (9 more 19 to 32 years of age) inhaled 95% oxygen and 5% nitrogen for 20 minutes. Blood samples were taken and tested. In younger persons pO_2 decreased for all oxygen levels studied; pCO_2 remained almost unchanged. This indicates a shift of the oxyhemoglobin dissociation curve to the left. In older persons this shift was only slightly absent. In older persons pCO_2 increased, apparently as a result of decreased pulmonary ventilation. The left shift in young persons is an adaptive reaction, protecting the tissue from elevation of pO_2 . This mechanism is less effective in older persons. Figures 2; references 15: 11 Russian, 4 Western.

[1512-6508]

INFLUENCE OF TEMPERATURE IN VIVO AND IN VITRO ON OXIDATION AND PHOSPHORYLATION IN WHITE RAT MYOCARDIAL MITOCHONDRIA

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 97, No 8, Aug 84 (manuscript received 15 Jul 83) pp 173-175

PREOBRAZHENSKAYA, V. K., Institute of Physiology, Siberian Department, USSR Academy of Medical Sciences (director and corresponding member of USSR Academy of Medical Sciences V. A. Matyukhin), Novosibirsk

[Abstract] The task of this work was measurement of oxidation and phosphorylation in myocardial mitochondria under the influence of temperature and with acute and chronic cold effect on the entire organism. Experiments were performed on mature white male rats adapted to cold 3-4°C for 4 to 5 weeks. Control and adapted animals were exposed to short-term hypothermia at -20°C to a rectal temperature of 22-25°C and subsequent warming at room temperature until normal body temperature was returned. Mitochondria preparations were obtained before cooling, in hypothermia and after rewarming. Acute cooling of control animals accelerated respiration of isolated myocardial mitochondria. The mitochondria taken from the myocardium of warmed animals after hypothermia retained elevated respiration rate in the second and third metabolic states. Long-term moderate cold exposure increased the rate not only of respiration but also of phosphorylation. The data obtained thus indicate an increase in oxidative and phosphorylating capacity of myocardial mitochondria in response to cold of various durations and degrees. Cold adaptation changed the reaction of the mitochondria to brief hypothermia and subsequent rewarming. Upon reduced temperature in vitro, restoration and phosphorylation rates decreased, phosphorylation less than restoration. References 11: 8 Russian, 3 Western.
[1512-6508]

UDC 616.31-005.4-036.11-02:613.(048.8)

CLIMATOLOGICAL ASPECT OF EPIDEMIOLOGY OF ACUTE DISTURBANCES OF CEREBRAL BLOOD CIRCULATION (SURVEY)

Moscow ZHURNAL NEVROPATOLOGII I PSIKHIATRII imeni S. S. Korsakova in Russian Vol 84, No 9, Sep 84 pp 1406-1412

FEYGIN, V. L., Novosibirsk

[Abstract] A survey of the literature is used in a description of the effect of some meteorological factors and complexes of them (types of weather, time of year, solar activity, geophysical activity) on the rise, course and outcome of some acute cerebral vascular diseases. A comparative clinical and climatological analysis of morbidity from acute disturbances of the cerebral blood circulation, and mortality patterns from these disturbances, in

different geographical zones of Soviet Union is presented also. In each of the geographical regions of the USSR studied, climatic and weather factors had different effects on the rise, development and outcome of cerebral circulatory disturbances. It is assumed that establishment of some clinical and climatic regularities in regard to such disturbances will permit development of adequate organizational measures to help prevent acute cerebrovascular diseases. The survey has shown that this area of medical climatology is inadequately developed. References 140: 122 Russian, 18 Western.
[1555-2791]

DEPUTY HEALTH MINISTER RESPONDS TO QUESTIONS RAISED IN ARTICLE

Moscow IZVESTIYA in Russian 26 Oct 84 p 3

[Text] In response to an article published in IZVESTIYA (No 193, 1984) by L. Ivchenko entitled "Take Your Sliding Scale Payment, Nurse," the following answer under the signature of USSR Deputy Minister of Health O. Shchepin was received:

The USSR Ministry of Health, after having reviewed the article published in IZVESTIYA reports that the questions raised in that article are of vital importance. The problem of junior medical personnel is an urgent one in major cities and industrial centers and is becoming more acute with the passage of time. The staffing level of these workers throughout the country as a whole is about 80 percent, and if one includes the number of personnel who are performing these duties as a second job by way of combining their professions, that level comes to 96.6 percent. Recruitment of middle-level medical personnel for carrying out the duties of hospital attendants and junior nurses to care for the sick has been in effect since 1973. In this situation, nurses have been getting supplementary payments of up to 30 percent of their base pay without increasing their work hours. Selective checks have shown that this practice has become significantly widespread in health institutions. At the same time, there is no doubt that a major method of solving the problem of junior medical personnel in therapeutic-prophylactic institutions is to broaden the training of nurses by transferring to the latter greater responsibilities in caring for patients. With this purpose in mind, the number of acceptances to secondary medical schools was increased in the 10th Five-Year Plan. That number will be even greater in the 11th Five-Year Plan and, in accordance with estimates of the USSR Ministry of Health, the number should be significantly increased again in the 12th Five-Year Plan.

In recent years, the Ministry of Health has been taking several measures to ease the shortage of the aforementioned personnel (providing special benefits upon entrance into medical VUZes, the recruitment of medical VUZ students and secondary medical school pupils for patient care work, and the acceptance of outside-city personnel for whom housing is provided, etc.). However, the shortage of these personnel continues to increase. Now, at the suggestion of the ministry, with the permission of the USSR State Committee for Labor and the All-Union Central Trade Union Council in concert with the USSR Ministry of Finance, an experimental brigade form of organization and junior

medical personnel wages is being implemented in 23 major hospital institutions. In this case, in return for an increased work load, including an increase in the number of seriously ill patients receiving care, the brigade members, provided quality care is rendered, will receive a differentiated supplemental payment of up to 50 percent of their base pay. In addition, they will receive prize money of up to 25 percent of their base pay for quality care of patients.

The USSR Ministry of Health, in sharing the view that an improvement in the wages of health workers is essential, including that of middle-level and junior medical personnel, has prepared appropriate proposals.

IZVESTIYA states that "In publishing the response of the USSR Ministry of Health, we wish to inform the reader that we shall try to report in the pages of this newspaper the experience gained in hospitals where the experimental brigade form of junior medical personnel work organization is in operation."

6289

CSO: 1840/059

HEALTH CARE TO AVOID WORK INTERRUPTIONS

Riga CINA in Latvian 14 Sep 84 p 2

[Article by A. Ancupans, secretary, Soviet of LaSSR Trade Unions: "Labor Collective in the Protection of Health"]

[Text] Because greater contentment is at the heart of the socio-economic policies of the CPSR, there exists concern with the constant increase of life-span levels of soviet citizens and their growing material and cultural needs. The goal to lengthen the healthy, functional, and creative lifespan of workers and, if possible, to preserve for a longer period of time their capacity to work, is humane and noble.

Among the social tasks put forth by the 26th Congress of the CPSU, and by the Central Committee Plenum and the USSR Trade Union 27th Congress significant emphasis has been placed upon the preservation of the health of workers. The republic's trade unions together with health care agencies and economic organizations are systematically developing a medical service network, thus providing for the strengthening of workers' health with the end result -- diminishing of lost worktime. All the more so because at the beginning of the five-year plan in the republic loss of worktime because of illness surpassed many times the worktime loss for other reasons. In 1980 the LaSSR Soviet of Ministers and the Soviet of Latvian Republican Trade Unions in a joint session explored the question of steps to be taken in order to attain a significant break in this tendency.

*In the three years of the 11th Five-Year Plan much has been accomplished in the republic. The complex five-year plans for the improvement of work conditions, labor protection and sanitation are being realized by all branches of the national economy. The program that has been worked out for the time-frame until 1990 is developing successfully. It anticipates progress in the completion of a people's health-care system. In this area much help by the trade unions is being given to factories, the building industry, and transport. Presently almost every third worker can receive outside medical assistance, which is administered by 12 medical and health facilities, over 150 shop doctor therapeutic districts and almost 700 health spots. An automated system has also been created which studies the dynamics of illness-caused worktime losses.

The trade unions of the republic, monitoring the state of health of workers, are organizing, for the second year now, a short-term illness expertise quality audit not only on the branch, but also on a territorial principle. In 1982, 23 regional audits took place. The results of these were discussed by party and soviet organs. For instance, in the regions of Liepaja, Ludza, Saldus and Kraslava such an analysis was especially effective. In 1983 alone, in accordance with the proposals of the unnamed doctors of the departments of republic trade union committees, over 430 questions dealing with the health protection of workers were scrutinized. This significantly reduced the number of unfounded illness excuse-sheet handout incidents.

Combined efforts have yielded positive results. In the three years of the present five-year plan, when compared to the 10th Five-Year Plan, time losses for reasons of illness have decreased by 12.1%. That allows for the use of almost 5,000 additional workers daily, and the saving of hundreds of thousands of rubles in national social security resources.

For its achievements toward the protection of workers' health, LaSSR has twice received the All-Union Trade Union Central Committee Certificates and Premiums. Our republic in the eight-region state count within the time-frame of 1983-1987, has been entrusted to accomplish an experiment which anticipates greater personal interest of work collectives, trade organizations and health-care organs in the lessening of worker illness incidents. In accordance with the rules of the experiment, in the event of a decrease in the incidence of illness, a special fund will develop. This can then be used for worker health care in labor collectives. That is vitally important, because worktime losses due to illnesses are still substantial. For this reason thousands of people do not report for work daily.

With responsibility and initiative these problems are being solved by the workers of machine and small engine manufacturing, grocery, chemical and petro-chemical industry, the national commerce and consumer cooperatives, as well as other trade union and republican committees, who, for their attainment, received the all-union Trade Union Central Committee premium in 1983.

Positive results are also attained, for instance, by the practice of the textile and light industry worker trade union republic committee working together with the branch ministry, to annually conclude a mutual agreement and exchange information on its fulfillment. The effectiveness of this practice is reinforced by positive examples in the solving for the branch its most acute problem -- the lessening of worktime lost in conjunction with the caring for sick offspring. Recently, for instance, many primary school-age children's institutions have been built. In the Liepaja and Ogre combines this question has now been practically solved. For the care of sick children there has been created in Ogre a sanatorium-type child-care center, "Saulite", where the little ones are kept all day and night. Each summer over 1,600 school children improve their health in three sanatorium-type pioneer camp shifts. During the winter these shifts are organized by the disease-prevention center "Mezaparks". Mothers together with children rest there during the summer. Analysis shows that among those children who frequent the 59 branch primary school-age children's institutions the incidence of illness has decreased, respectively also worktime losses due to the care of children have lessened.

In worker collectives various forms and methods are used for improving health. In the Ogre knitted fabric combine workers were complaining of feeling uncomfortable, when using anti-phonetic earphones. These were wired for sound, started transmitting music and the number of complaints dropped sharply. Especially popular in the combine is the study, work, and relaxation room where over 200 people daily accumulate energy and a good frame of mind. Not only is functional music heard in this consulting room, but massages are also available, one can be engaged in medicinal physical exercise and self study. In the last five years in this branch the incidence of illness has dropped by 147 days per 100 employees.

The trade unions are expanding the role and effectiveness of the engineer and physician brigades and are seeing to the wide dissemination of the experience of the "VEFA" employees into the branch. Such a brigade deeply probes into the causes of illnesses and traumatizations and studies the influence of various factors upon health. In cooperation with the company's bureau of labor scientific organizations, on whose staff are a sociologist, a psychologist, and a physiologist, a labor/rest regimen has been worked out for the employees and an environmental protection section has been established. All in all, the brigade has submitted over 200 proposals, the adoption of which has improved work conditions, heightened productivity, and lessened worktime losses.

An interesting experience has been saved for the chemists. The branch collectives supported the initiative of the Ziemeldona colleagues who worked out a "health codex for chemists". The first ones to adopt it were the people of the Daugavpils chemical fibre manufacturing union. The requirements of the codex: to work without traumas or accidents, to provide for a high work culture, quit smoking, participate in sport...the Daugavpils people are striving not only to observe these requirements but also to improve their workrooms, to spruce up their shops, as well as to participate in other health-improvement projects.

Yes, health is indeed an economic category. Concern over it has a great economic effect. The experiences of production unions "Radiotechnic", "Latvia", "Riga Fabric", "Alfa", and factory "Straume", all attest to that. Year by year the strengthening of its workers' health is looked after also by one of the oldest concerns in the republic -- "Red Metallurgy". There, installed right in the shops, are oxygen inhalators, there are relaxation rooms for the treatment of vibro-sickness, and workers at the end of their shift can receive water massages, sun lamp treatments, and make use of other procedures. Also in the Jelgava dairy combine illness-caused loss of worktime has decreased noticeably.

Experience shows that the incidence of illness is always smaller in those concerns that have their own medical stations, poly-clinics, disease-prevention centers. Recently new medical rest and relaxation rooms have been opened at the micro-bus factory "RAF", in the Ogre knitted fabric and Liepaja haberdashery combines, as well as in others. Medical workers have gained earned authority in the factory "RAF". According to their suggestions sociological experiments into the reasons for work inability are being conducted. The medics recommend also in several districts the improvement of work conditions; social drug abuse posts and health corners were established.

Complex questions of health protection are being solved in the kolkhozes: "Iecupesis", "Nakotne", "Adazi", and "Zvejnieks". Here they have mechanized work-capacity processes, as also the necessary rooms for medical service. As a result of the 26th CPSU Congress, a disease-prevention center, two kindergartens and an ambulance were put into operation this year in the kolkhoz "Robeznieki" and the sovkhos "Baltinava" and "Skaune". Together with the medical workers, the trade unions also put on annual raids. They examine how concerns, schools, pre-school-age children's and establishments which prevent disease by medical means prepare for their tasks during the winter time. This diminishes the number of incidents of colds. Even the periodic flareups of influenza no longer do so much damage.

In order to minimize worktime losses for reasons of illness the medical treatment in sanatoriums and spas is being propagated and made more effective and dietetic regimen is being perfected. Over 200,000 people annually improve their health in our hospitals. The sanatorium "Latvia, the family rest pensionat "Lielupe", and new wings in the Kemerī and Baldone spas, as well as others, have been turned over for use by workers.

Nevertheless, during the first half of this year worktime losses for reasons of illness have grown here and there. Especially so among farm workers, as also in the Baltic Railroad System, the workers' trade unions of the electrostations and electrotechnic industries are covering for these concerns. That is why ministries and departments, along with the trade unions, must insure that in each labor collective, those in charge of the collective, together with the local trade organizations and medical workers, examine no less than once every quarter the causes of illness incidents and carry out actions to avoid this.

Health is the treasure of all of us, as well as of our society. The trade unions of Latvia together with local organs, must activate the fulfillment of the social programs worked out by the party, they must perfect the protection of worker's health, and concern for the growth of social production and they must be more closely allied in concern over the conditions of each person's work and lifestyle.

12708

CSO: 1808/001

RESPONSIBILITIES OF PHARMACISTS

Moscow KOMSOMOL'SKAYA PRAVDA in Russian 13 Oct 84 p 2

MAGAL'SKIY, L.

[Abstract] Letters to KOMSOMOL'SKAYA PRAVDA complaining about drug shortage and indifference of pharmacists were the object of a discussion with A. D. Apazov, Chief of the Main Pharmaceutical Administration of the RSFSR Ministry of Health. The primary complaints dealt with indifference of pharmacists to pleas for help from customers with prescriptions, and to some extent with physicians that refuse to prescribe drugs known to be in short supply. A. D. Apazov emphasized that such behavior is intolerable and that guilty pharmacists have been reprimanded in the past, and that all possible measures are being taken to uncover unsuitable individuals in such positions of responsibility. He also delineated the limitations under which the pharmacist works, and how much depends on the physicians and their willingness to be cooperative. Since physicians can prescribe some 2000 drugs in the USSR, it is unavoidable that some preparations may on occasions be in short supply. At the present time there are 14,400 drug stores and optical centers in the RSFSR, an indication of the improvement in quality of health care, and the qualifications and responsibilities of the personnel are continuously being monitored. A number of decisions have been made by the Party and the Government to assure the average citizen that he or she will be treated professionally and with understanding.

[031-12172]

PROBLEMS WITH PHARMACIES

Moscow PRAVDA in Russian 24 Sep 84 p 7

MIRONOV, B.

[Abstract] An interview was conducted with M. A. Klyuyev, Chief of the Main Pharmaceutical Administration of the USSR Ministry of Health, to obtain answers to many letters from readers expressing dissatisfaction with services at their local pharmacies. Basically, the problems deal with drug shortage, indifferent service, lack of certain drugs in other cities as opposed to their ready availability in Moscow, unavailability of medicinal plants, and

so forth. M. A. Klyuyev expressed his deep concern and understanding of the readers' problems. He stated that everything that can be done is being done to better the services rendered to the public, including better training of pharmacy personnel, instilling in them a higher sense of duty and responsibility, procurement of drugs on a scale designed to meet local demand, etc. However, there are obvious problems, such as mass production of drugs highly in demand and distribution networks, and the fact that many research and clinical establishments have their headquarters in Moscow cannot help but be reflected in greater availability of certain items in the capital. For example, there is obvious need for more than the present 27 soykhozes that are concerned with supplying the raw materials for producing drugs derived from plants, and yet care is being taken to keep costs down. In addition, it is also the responsibility of physicians to be aware which drugs are in short supply and to prescribe equivalent substitutes. An indication of the trends in improving pharmaceutical services is the fact that pharmacies have already been opened at 4,300 polyclinics, particularly in Kaunas, Estonia, Moldavia, and Ukraine.

[034-12172]

UDC 614.7-07:312.6]-07

METHODOLOGICAL PRINCIPLES OF SYSTEM FOR COLLECTION, PROCESSING AND REPORTING DATA ON CHANGES IN POPULATION HEALTH STATUS RELATED TO ENVIRONMENTAL POLLUTION

Moscow GIGIYENA I SANITARIYA in Russian No 6, Jun 84 (manuscript received 12 Dec 83) pp 41-43

KORNEYEV, Yu. Ye., Scientific Research Institute of General and Communal Hygiene imeni A. N. Sysin, USSR Academy of Medical Sciences, Moscow

[Abstract] To improve studies concerned with environmental pollution, methodology was developed for collection, processing and reporting data on health status of the population related to changes in environment, based on decisions of CC CPSU, 1 Dec 78. A 7-10% sample of the population was deemed necessary to give data representative of the entire population. To determine health patterns, data must be collected from hospitals which represent the best overall records of individuals and possible causes for their complaints; data to be collected include clinical entries, mortality due to specific pathological states, birth rates and the courses of pregnancy. The need for computerization of data banks was stressed. References 3 (Russian).

[1549-7813]

PRENATAL AND POSTNATAL HEALTH

Moscow LENINSKOYE ZNAMYA In Russian 20 Sep 84 p 4

DEMIDOV, V. N., Chief of Functional Diagnostic Laboratory, All-Union Scientific Research Center for Health Protection of Mother and Child

[Abstract] Letters from the readers of "LENINSKOYE ZNAMYA" are handled by the author. The first topic concerned prenatal ultrasound examination of the child which at this moment is still a restricted technique. Concerning the question of an "ideal" child-bearing age, the 20-25 years group appears to be the most desirable time range. Although not proven statistically, there are impressions among many that healthier babies are born in spring. An attempt is made to explain this by the fact that they were conceived during summer, probably during vacation time when the parents were in "peak" form and that they had the summer months in which to gain strength. The question of the children fathered by alcoholics is side-stepped stating that each mother must decide whether she wants a child of an alcoholic.

[049-7613]

PATIENT AND HOSPITAL

Moscow TRUD In Russian 14 Sep 84 p 2

IL'ICHEVA, Ye.

[Abstract] An article on the above theme was published by N. Stikhnov ("Trud", 12 Apr 83); in the present article a "round table" type discussion based on letters received by the editor is reported. In spite of many salutary letters concerning medical treatment, just as many were received complaining about the shortcomings of hospitalization. Many of the complaints were addressing the bureaucratic complications and the resulting lack of direct responsibility. One aspect concerned the professionalism of the nursing staff: "one should not hire just about anybody for medical care services" was the conclusion. Quality of therapeutic care was another issue: it appears that many individuals are involved in treatment activities in the hospital: the physicians, nurses, the practical nurses, etc.; the problem appears to be the inadequate staffing, insufficient supplies and equipment, poor quality of the available equipment. Overall, this article appears to present a challenge to many ministries involved in health care to correct their shortcomings.

[042-7813]

IMPROVING WORKERS' HEALTH

Moscow TRUD in Russian 17 Oct 84 p 1

[Abstract] The current campaign in the USSR on improving the general state of health of the Soviet population also has its interesting ramifications at the various industrial plants and other enterprises. This stems from the fact that not only occupational health personnel are directly involved in health screening and surveys at the work site, but administrative and Party organs also take an active interest and facilitate the work of the former. At many worksites, clinics and ambulatory services have been established thanks to administrative intercession, and ancillary services--such as day care centers--have not been neglected. Unfortunately, at many plants, the administrative bodies feel that the enterprise is either not ready or too small for the investment of funds for improving or establishing new services and clinics, and such inertia can only be overcome by education and directives from the appropriate ministries. For complete success in the field of industrial health there must be close cooperation between the health, administrative and labor union personnel.

[063-12172]

BRIEFS

UZBEK MEDICAL FACILITIES--Every year 300,000 workers of the republic, many of whom are on special benefit or nonpayment leaves, paid for by state social insurance, rest and recover their health in sanatoria, rest homes, treatment-sanatoria, and boarding houses of Uzbekistan. The republic has 6,080 obstetric stations, 870 medical outpatient clinics in the kolkhoz and sovkhoz region, 375 rural hospitals, 157 central and rayon hospitals, 2,200 polyclinics with outpatient clinics, 1,200 hospitals of various specialization, more than 2,000 health stations, medical, and obstetric stations in industrial enterprises, construction, and transportation facilities, and 47 medical units attached to industrial enterprises. The republic has more than 50,000 physicians and 150,000 paramedical personnel. There are 30 physicians and 85 representatives of paramedical personnel for every 10,000 persons in the population. That number is several times less in the countries adjacent to Uzbekistan. The universal prophylactic medical examination that is now being given to the public has included 54 percent of the population. Each and every one of the children and teenagers, retired persons, invalids and war veterans, athletes, and students will be examined. Numbered among the well-known medical institutions are the Tashkent branch of the All-Union Scientific Center for Surgery, the Uzbek Scientific-Research Institute of Virology imeni Ivanovskiy, the Uzbek Scientific-Research Institute of Sanitation, Hygiene, and Vocational Illnesses, and many others. [Text] [Tashkent PRAVDA VOSTOKA in Russian 27 Sep 84 p 3] 6289

RESTRICTION ON RURAL PHARMACIES DEPLORED--For 20 years now, I have been in charge of a rural pharmacy. I feel great satisfaction when I am able to help a person. But is sometimes happens that it is necessary to refuse medicines to sick people. As matters stand, our small pharmacies are not supposed to carry cholosas and vitamin U, medicinal bile [zhelch' meditsinskaya], klofelin, and other very high-demand medicines which are in the pharmacy warehouse. We are trying to serve the villagers as well as possible. And so it hurts, when a sick person, in order to buy almagel, panangin, or aloe, must travel 20-50 kilometers. This prohibition is a serious detriment to the service of rural swellers. [By V. Robas, pharmaceutical chemist, Krasnoarmeyskoye Settlement, Kiev Oblast] [Text] [Moscow MEDITSINSKAYA GAZETA in Russian 12 Oct 84 p 1] 12255

RAYON HOSPITAL NEEDS HEAT--The central rayon hospital in Yesil opened seven years ago. We were envied--a big, beautiful building with all the conveniences. But our rejoicing was a mistake. All these years we have not been working but suffering. In the winter and late autumn, wearing our coats, hats, and felt boots we have been preparing medicines. The radiators are icy, and water freezes on the floor in the aseptic room. We have turned everywhere for help. We went to the rayispolkom, to Comrade Zakarin. He promised to get us ten heaters. That was last winter, and now another is already upon us, and so far not one heater. We also talked with the head of the pharmacy administration, Comrade Murzashev. He said: "Your conditions are not our responsibility. Appeal to the local authorities." A vicious circle is the result. Collective of Pharmacy No 10 (letter followed by nine signatures). Turgay Oblast, Kazakh SSR. [Text] [Moscow MEDITSINSKAYA GAZETA in Russian 12 Oct 84 p 1] 12255

CSO: 1840/1565

SOME APPROACHES TO MASS CLINICAL SCREENING IN PSYCHIATRY

Moscow ZHURNAL NEVROPATOLOGII I PSIKHIATRII imeni S. S. Korsakova in Russian
Vol 84, No 9, Sep 84 pp 1416-1417

POTAPOV, A. I. and POLOZHIY, B. S., Tomsk

[Abstract] A working model to be used to develop forms and methods of mass psychiatric screening was organized at a major industrial enterprise in Tomsk. The subdepartment performing this work was named the Health Protection Center. It has all facilities necessary for conducting psychoprophylactic, clinical-diagnostic, therapeutic and rehabilitation work. Mass clinical screening of workers includes three basic stages: a thorough examination of workers with the aid of screening questionnaires; further examination of and consultation with persons whose screening questionnaire was "unsatisfactory" and provision of psychiatric assistance to persons who are found to need it. Several thousand workers have been screened by this method and a considerable number of these have been judged to be on the verge of psycho-neurotic distresses.
[1555-2791]

PSYCHOLOGY

REFLEX DYNAMICS IN PRODUCTIVE MENTATION

Moscow VOPROSY PSIKHOLOGII in Russian No 5, Sep-Oct 84 (manuscript received 11 Jun 83) pp 117-124

BOL'SHUNOV, A. Ya., Psychology Faculty, Moscow State University, MOLCHANOV, V. A., director of the Chess Circle, Pioneers' Home, Volgograd Rayon, Moscow, and TROFIMOV, N. M., Kalinin State Pedagogical Institute

[Abstract] Experimental studies were conducted with second to fourth grade students (20 in all) to analyze reflex acts in productive mentation, using a modified chess game as model activity. The studies confirmed the fact that genesis of comprehension of mentation can be categorized into three stages. These stages differ in the degree of explication of a meaningful intention. In the initial stage, active reflexive mentation involves estimation and sanctioning of intended acts. This is in turn followed by active goal-setting with reflexivity employed to monitor the goal-achieving process and assessment of the probability of achieving the intended goal. Finally, the scope of reflexive control widens in the third stage since the subject now is conscious of the immediate results of goal achievement. Figures 3; references 19 (Russian).

[107-12172]

MEASUREMENTS OF INTELLECTUAL PRODUCTIVITY

Moscow VOPROSY PSIKHOLOGII In Russian No 5, Sep-Oct 84 (manuscript received 15 Dec 83) pp 142-147

YAMPOL'SKIY, L. T., Scientific Research Institute of General and Educational Psychology, USSR Academy of Pedagogical Sciences, Moscow

[Abstract] A battery of tests was employed on 200 subjects with a mean age of 23.1 years and education level of 9.8 grades to assess intellectual productivity in terms of logical and combinational mentation. The tests involved logical combinations (husband-wife, mother-son type) and 20 deductive reasoning assignments. On the basis of the findings, parameters were determined for successful intellectual activity, which led to the assessment of intellect on the basis of three factors: a) rate of ideomotor processes, b) correctness of solution of simple tasks, and c) correctness of solutions

of complicated tasks. The empirical results led to the proposal of a two-dimensional model of intelligence, which relies on a mathematical function describing success in problem solution in relation to the latter's difficulty. Figure 1; references 7 (Russian).
[107-12172]

HUMAN PHYSIOLOGICAL CORRELATES OF SUCCESS AND FAILURE

Moscow VOPROSY PSIKHOLOGII in Russian No 5, Sep-Oct 84 (manuscript received 16 Jan 84) pp 131-137

BATURIN, N. A., Chelyabinsk State Institute of Physical Culture

[Abstract] Psychophysiological correlates of success or failure were studied with 60 athletes, 17 to 24 years old, using two motor tests with feedback on appropriate or inappropriate responses. Evaluation of a broad spectrum of physiological functions demonstrated that definite physiological responses pertain to success (appropriate response) or failure (inappropriate response). A successful performance was found to be accompanied by increased activation of the autonomic nervous system. Failure, on the other hand, entailed activation of the central nervous system and subjective feelings of inadequacy. Figure 1; references 19: 14 Russian, 5 Western.
[107-12172]

RADIATION BIOLOGY

WORK ON RADIATION EFFECTS OF LYMPHOCYTES ENDORSED FOR STATE PRIZE

Moscow MEDITSINSKAYA GAZETA in Russian 10 Oct 84 p 3

IL'IN, L., member of the USSR Academy of Medical Sciences

[Abstract] The author discusses the nature and significance of a cycle of research in the field of molecular principles of the radiation destruction of lymphoid cells. Soviet scientists are said to be among the world's leaders in this branch of radiobiology.

The author identifies eleven radiobiologists who, as a team investigated the mechanism of interphase destruction of irradiated lymphoid cells. These scientists discovered that the breakdown of DNA in irradiated lymphocytes results from the activation of the enzyme nuclease in these cells following irradiation. Similar biochemical changes which lead to the death of lymphoid cells were found to result from the action of corticosteroid hormones whose amount increases in the body during stress. The death of cells was represented for the first time as a genetically determined process which accompanies specific biochemical reactions. A concept of the existence, in cells of higher organisms, of a special genetic program which controls the death of cells has been formulated on the basis of the radiobiologists' work.

Results of this project are said to be extremely important for the solution of problems of oncology and transplantology, and they are expected to further the development of methods for early diagnosis of radiation injury and for the prevention and treatment of radiation sickness. The author endorses the nomination of the radiobiologists' work for the 1984 USSR State Prize.

FTD/SNAP

CSO: 1840/1572

CONFERENCES

STATE OF RADIATION THERAPY VIEWED AT RADIOLOGISTS' CONGRESS

Moscow MEDITSINSKAYA GAZETA in Russian 17 Oct 84 p 3

LEPEKHIN, A., correspondent

[Abstract] A collection of articles summarizes the proceedings of the 11th All-Union Congress of Roentgenologists and Radiologists, which was held recently in Tallin. The conference discussed problems and prospects of x-ray and radioisotope diagnosis, radiation therapy, clinical radiobiology, and their physical-technical support, as well as organization of x-ray and radiologic medical services.

Brief summaries are given of a report entitled "Results and Prospects of the Roentgenoradiology service in the USSR", by A. G. Safonov, USSR deputy minister of public health, and of reports and papers by other participants in the conference. Safonov assessed the status of roentgenoradiology R&D and specialist training, and he mentioned new types of diagnostic and therapeutic technology which are being developed and introduced. They include a microtron, which is undergoing clinical tests, apparatus for intracavitary radiation therapy, and instruments using the method of nuclear magnetic resonance.

A short article by Professor K. N. Kostromina of the chair of clinical radiology of the Central Institute for Advanced Training of Physicians mentions two papers that dealt with advances in radiation therapy. One involved work by A. N. Kishkovskiy of Leningrad and colleagues of Moscow and Voronezh on the use of radiation therapy in cases of mechanical traumas and their complications, and also burns and frostbite. These specialists reported that early radiation treatment promotes the better regeneration of tissues and accelerates healing of fractures. In cases of burns, irradiation has been used successfully to relieve pain, combat inflammatory edema and accelerate the removal of pyonecrotic tissues from wounds, thus shortening time for preparing them for skin grafts.

Another article briefly summarizes recommendations which were adopted in regard to problems discussed at the congress. Criticizing the technology available to the roentgenoradiology, service, delegates noted in particular that a large share of roentgenoscopy is still being performed with conventional screens, that a shortage of automatic developing equipment exists, that work on radiomagnetic and ultrasonic tomography is lagging, and that the quality and operational reliability of many equipment items are low.

UDC 616.831-002.022:578.833.26]:06.3(571.12)"1983"

MEETING ON COMPREHENSIVE RSFSR PROJECT FOR RESEARCH ON TICK-BORNE ENCEPHALITIS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 5,
Sep-Oct 84 p 89

VERETA, L. A., professor, Khabarovsk

[Abstract] A meeting was held in Tyumen on March 29-30, 1983 on "developments in the Prevention, Diagnosis and Treatment of Tick-Borne Encephalitis: 1981-1990", which was organized by the RSFSR Ministry of Health, and dealt with the discussion of the comprehensive RSFSR project for research on viral encephalitides. V. S. Kokorev (Sci. Res. Inst. of Natural Endemic Infections, Omsk) outlined the project in general, with its objectives of lowering morbidity and mortality. L. A. Vereta (Inst. of Epidemiology and Microbiology, Khabarovsk) indicated that progress can only be made if full reliance is placed on developments and advances in the basic sciences. V. I. Zlobin (Inst. of Viral Infections, Sverdlovsk) emphasized the need for improvements in diagnostic methods, and I. N. Blokhina (USSR Acad. of Medical Sciences) pointed out the need to involve geneticists and molecular biologists in the research on viral encephalitides. Finally, L. S. Subbotina (Sci. Res. Inst. of Natural Endemic Infections, Omsk) dealt with problems encountered in bringing the project to fruition. Professor D. P. Nikitin, chairman of the Scientific Council of the RSFSR Ministry of Health, proposed submitting the project for approval.

[1600-12172]

BRIEFS

HUNGARIAN PHARMACEUTICAL EXHIBIT--An exhibit, "Veterinary Preparations Exported by the Hungarian Foreign Trade Enterprise Medimpeks," organized by the USSR Chamber of Commerce and Industry, opened at the Scientific-Research Institute of Animal Husbandry and Veterinary Medicine of the TuSSR Ministry of Agriculture. The exhibit was opened by Secretary of the Turkmen CP Central Committee M. A. Charyyev. For a period of 3 days scientific associates of Hungarian pharmaceutical enterprises will acquaint Soviet specialists with new medical preparations. Lectures on new methods of animal prophylaxis and therapy will be given in the auditoria of the Agriculture Institute imeni M. I. Kalinin. Hungarian pharmacologists have been delivering their products to the USSR for more than 30 years. The medicinal preparations manufactured at the world-renowned pharmaceutical enterprises of Hungary are distinguished by their high quality and efficacy in the treatment of agricultural animals. The exhibit is of considerable interest to Soviet specialists. Representatives from Uzbekistan, Tadzhikistan, Estonia, and other republics came to Ashkhabad to see the exhibit. "Medicinals manufactured in Hungary are being used successfully by the republic's veterinarians," said the director of the republic association Turkmen-zoovetsnabzheniya [Turkmen Zoological and Veterinary Supply], B. G. Kalustov. "The meetings with the Hungarian specialists, their discussions and consultations will help us to obtain fuller information about the effective use of the preparations." The special literature widely presented at the exhibit was also of considerable interest. The opening of the exhibit was also attended by Deputy Chairman of the TuSSR Council of Ministers R. A. Bazarova. [Text] [Ashkhabad TURKMENSKAYA ISKRA in Russian 19 Oct 84 p 2] 6289

SEMINAR OF MOLECULAR BIOLOGISTS--In Eberswald (the Bezirk of Frankfurt-ander-Oder) a seminar of specialists in the field of molecular biology from CEMA member countries has begun work. Its participants, representing Bulgaria, Hungary, the GDR, Poland, the Soviet Union, Czechoslovakia, and also Yugoslavia, are discussing questions connected with the study of biological objects, particularly membrane systems and proteins, using spectroscopy. They are also adding up the results of carrying out the contract made between CEMA member countries concerning research in the field of biophysics. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 12 Sep 84 p 3] 12255

CONFERENCE ON SIBERIAN DEMOGRAPHY, HEALTH--In Novokuznetsk, at the facilities of the Scientific-Research Institute of Complex Problems of Hygiene and Job-Related Illnesses of the Siberian Department of the USSR Academy of Medical Sciences, there was a scientific-practical conference titled "Demographic processes in Siberia and the effectiveness of health care endeavors." Participants in the conference--specialists in the field of social hygiene and medical demography, health care organizations, demographers, economists, and leaders of oblast and kray branches of Siberian health care--discussed medical-demographic processes in Siberia, the social-psychological factors in the formation of a family and methods of studying them, problems of dispensarization of the population in connection with trends of demographic processes, and so forth. [By A. Popov] [Text] [Moscow MEDITSINSKAYA GAZETA in Russian 12 Oct 84 p 3] 12255

CSO: 1840/1565

MISCELLANEOUS

COOPERATION OF SOVIET AND INDIAN SURGEONS

Moscow MOSCOW NEWS in English No 47, 2-9 Dec 84 p 10

[Article by Maria Gryzunova]

[Text] "This is a splendid Center, outstanding in your country and, perhaps, in the world. It is a gift not only to the Soviet people but also to other peoples." These remarks were made by Professor G. B. Parulkar, a noted Indian cardiologists from Bombay. Together with a group of doctors active members of the Indo-Soviet Cultural Society and Friends of the Soviet Union Society, he was taken on a tour of the All-Union Cardiological Center of the USSR Academy of Medical Sciences.

Professor Parulkar led a delegation which took part in the Soviet-Indian medical symposium in Moscow arranged on the initiative of the Soviet-Indian Friendship Society.

Exchanges of ideas are always beneficial and the Soviet participants in the symposium that discussed the latest surgical achievements in the USSR and India, as well as the contribution of the medical profession to the peace campaign, were shown color slides illustrating methods of heart surgery pioneered at Professor Parulkar's clinic in Bombay. They were also brought up-to-date on methods for treating mitral stenosis under by Indian doctors.

Soviet cardiologists spoke highly of their Indian colleagues' professional skills and shared with them their achievements. The medical service and surgery in the USSR are of very high standards. This was the view of all members of the Indian delegation. Protecting health, the Soviet and Indian doctors voiced their fears for mankind's future in view of the deterioration in the international situation, and stated that their duty in these conditions was to fight for peace and to save mankind from death.

CSO: 1840/159

EFFECTS OF SURFACE ELECTRICAL DISCHARGES ON WATER POLLUTANTS

Moscow GIGIYENA I SANITARIYA in Russian No 5, May 84 (manuscript received 13 Nov 82) pp 8-9

VIYTLMAA, E. Kh., BRODSKAYA, N. Kh., KIRSO, U. E. and LEESMENT, L. K.,
Institute of Chemistry, Estonian SSR Academy of Sciences, Tallin

[Abstract] High-voltage electrical discharges at water surface were analyzed for their decontaminating effects under laboratory conditions. The results demonstrated that such discharges at water-air interphase constitute a highly effective means of bacterial killing. With 30 kV potential (3 μ F, 1.5 J/ml) 99.8% of heterotrophic bacteria were killed, 99.7% of *E. coli*, and 96.1% of other enterococcal forms, providing potable water with an energy expenditure of 0.45 kW·h/m³. Such treatment was also effective in eliminating polycyclic aromatic hydrocarbons, with both the bactericidal and chemical effects attributed to $\text{HO}\cdot$ and $\text{HO}_2\cdot$ type of free radicals, singlet oxygen and ozone. These observations suggest that high-voltage electrical discharges at water-air interphase may represent a viable method for water decontamination, particularly in closed circulating systems. Figure 1; references 12 (Russian).

[1546-12172]

MATRIX APPROACH TO EVALUATION OF HEAT EFFECTS ON TEXTILES REFLECTION

Minsk VSESOYUZNIY ZHURNAL PRIKLADNOY SPEKTROSKOPII in Russian No 3
(manuscript received 12 Apr 83) pp 488-494

KOZERUK, A. S. and GUMINETSKIY, S. G.

[Abstract] A matrix analysis was employed to assess the effects of heating on light reflection by various textile materials, by determination of angular effects and nonzero details [Guminetskiy, SG, et al., Zh.P.S., 32(3): 519-524, 1980]. All measurements were conducted with 633 nm light produced by helium-neon LG-38 laser on cotton fabric, viscose, and natural silk.

The fabric samples used were both undyed and dyed with light-fast blue, orange or reddish dyes. In addition, silk was also studied when dyed with acid dyes. The measurement data, summarized in graphic form, revealed that the nonzero elements of light reflection are sensitive to heat. Analysis of such data should provide further insight into physical processes that occur in such materials as a result of heating. Furthermore, of immediate practical importance is the fact that such measurements can be used to determine thermal stability of a fabric. Figures 3; references 16 (Russian).
[040-12172]

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